# THE EFFECTS OF SEPTIC INFECTION IN THE NEONATAL PERIOD AND INFANCY, WITH SPECIAL REFERENCE TO THE BLOOD PICTURE IN THESE CASES.

by

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APPENDIX

LIST OF CASES.

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## INTRODUCTION.

In this thesis I shall record the results of observations I have made on the effects of septic infection in the neonatal period and infancy.

It is clearly recognized that infection with pathogenic organisms is a material cause of illhealth and disease in infancy, particularly those cases in which the organism is of a specific type such as the tubercle bacillus, the meningococcus, the gonococcus, and the typhoid dysentery group. In these the resultant illness usually produces localised evidences of disease with characteristic clinical signs and symptoms which can be confirmed by a pathological picture which is true to type.

It is doubtful if it has been sufficiently recognised that illhealth and disease in infancy, may be due to less virulent organisms such as the staphylococcus aureus, so frequently found in boils, abscesses and other skin lesions and responsible either for a localised lesion or a generalised spread throughout the body.

Of recent years the spread of infection from case to case in infant hospitals has received increasing attention among pediatricians. The ravages of infection are manifold - even under comparatively good nursing conditions, cases apparently on the road to recovery from malnutrition or incorrect feeding end fatally with a bronchopneumonia or gastroenteritis.

That such a result may be due to an undetected infection in the infant at the commencement of its illness, seems a rational supposition and my investigations on this point appear to support this view. It is surprising how frequently skin lesions, discharging eyes, discharging ears, etc., are considered of secondary importance or even overlooked in an infant with dyspepsia or marasmus, and the latter conditions regarded as the primary factor in the production of illhealth. The argument advanced in many such cases is that the infant is suffering from food disorder or malnutrition, and that later signs of infection are secondary results, due to lowered resistance. However, may not the primary infection be regarded as skin sepsis, otorrhoea, discharging eyes or pyuria and the invasion of the alimentary canal by organismal infection or irritation set up by normal inhabitants of the intestines, secondary to these influences?

Von Reuss, Czerny, & Keller, all believe that the intestinal wall of the newborn is peculiarly permeable to some bacteria, which could not pass through in older sucklings, and that the intestine as a port of entry ranks very high in the production of sepsis neonatorum.

It would, however, be erroneous to assume that all dyspepsias and cases of marasmus are secondary to sepsis and vice versa - though many so-called dyspepsias and cases of marasums owe their origin to parenteral infections - by which is meant infections in which any system of the body is implicated other than the alimentary canal.

When does this infection occur? For the purpose of convenience this has been classified as the neonatal period - but should in its real sense be applied to the period of infancy as well, which then embraces (1) The Prenatal stage, (2) Stage of Delivery, (3) Stage after Birth, up to the 3rd to the 5th week. The term sepsis neonatorum, therefore, appears to be rather limited, indeed infantile sepsis more accurately describes the cases to be discussed further in this issue.

It is in this period that the susceptibility of the infant to organismal invasion is at its height and even a mild infection may have far-reaching results and manifest itself at some time during the 1st year of life. This, however, may fail to occur in the 1st year as the resistance varies in individual cases,

amd an immunity to infection may be established early and so prevent the appearance of any clinical signs.

Some cases may present considerable difficulty in tracing source of infection - in fact some may fail to give any history of infection at all - though the greater percentage of cases reveals a traceable infection in the form of much handling and a difficult labour - puerperal sepsis etc., with a consequent stormy entrance into the world of the new individual. Some cases are infected in the lst few weeks of life due to hospitalisation, cases may be overlooked or not considered"contagious " and bed isolation with strict precautions fail to be carried out - in this way the disease may be passed on to another infant and so form an "acquired" form of infantile sepsis. Weakly infants are specially susceptible to invasion of organisms and succumb with alarming rapidity to an infection through faulty technique in nursing. The victims of these circumstances are generally in the homes of the poor and the ignorant; overcrowding, filthy home surroundings, unhygienic methods of childbirth and a thousand and one things that victimise the poor are responsible

for bad equipment of the infant in its struggle for existence. However, such calamitious occurrences are by no means confined to the poor - for people in better social conditions may also be contaminated at the hands of an unclean nurse, a hurried forceps delivery without strict aseptic precautions, and many other attendant factors, which predispose to infection. Since the infant is born under unfavourable conditions the seeds of so-called "illhealth" - failure to thrive are sown and assert themselves at some period in the form of urinary symptoms, digestive symptoms or other forms of disease.

Sepsis neonatorum as a true septicaemia in a newborn infant has received recognition for some years and has in most of such recognised cases been attended by death. Mild infections, insufficient to produce death, yet capable of asserting themselves in a variety of different ways, appear to have been entirely overlooked as constituting a definite clinical entity.

Included in this group of infections are those having the following manifestations:-

Skin sepsis - from a tiny papule to a vesicle - boils - abscesses - septic umbilicus- otorrhoea - otitis media - discharging eyes: pyuria - most of which are due to a staphylococcal invasion - the streptococcal infections fall under this group as well, but they produce marked toxaemia and do not really show the milder symptoms, which I propose to treat in detail.

Meninococcal, pneumococcal, tubercular, and gonococcal infections are not included in this group, as these constitute definite clinical entities in themselves.

The disease may run an acute course: subacute or chronic course. It is the subacute or chronic forms of sepsis which are here dealt with.

The clinical picture produced in staphylococcal infections varies widely. The infant may be premature, though this is not a constant feature of the disease. The history in regard to feeding appears somewhat typical - in most cases child has had breast for one week or more - then refused it and bottle feeding has been substituted instead.

In only a few instances has the infant remained on the breast for any length of time. The nutrition of the child does not appear to suffer at first at all - indeed a casual survey presents a fairly healthy looking infant and unless one is prepared to accept this view of sepsis, such a case may be dismissed from the consulting room only to pursue a course of misery and retrogression a few weeks later on. The daily record of the weight presents a characteristic chart, progress may be very slow or there may be an actual failure to gain weight and at certain periods a steady loss in weight. Skin sepsis must be carefully sought after, a crack behind the ears, septic spots on the face, arms, trunk - boils on the scalp, abscesses in any part of the body, - these comparatively little happenings may be sufficient to set up a septic process which acts as a centre for distribution of noxious agents, which traverse other systems with further symptoms. Discharging eyes and ears are to be looked upon in the same light, and to them may be attributed as serious results as to skin sepsis. It may be wise to examine the ear drums or to have a proper otologic examination if any dubiety exists as to their being affected. The drum membranes may show a colour change, the normal lustre being replaced bya dirty, grey appearance.

in the 1st few months of life - the older infants, i.e. towards the end of the 1st year may have a very much lowered haemoglobin, red blood cells are not reduced beyond 4 million as a rule and the white cells vary in individual cases. A full account of the blood findings and discussion on this subject is given in a separate chapter entitled "Haemotology of Infantile Sepsis".

A most striking feature of infantile sepsis is the remissions in the disease, perhaps these setbacks may be more aptly described as "slump periods". After a spell of good progress the infant goes back a step or two, takes feeds badly or vomits after them, pus re-appears in the urine, diarrhoea sets in, in general the septic process which has been dormant , lights up again and recommences the systemic infection. Digestive symptoms appear with as great prevalence as Respiratory ones . A temperature flare up with rapid breathing may be due to involvement of the upper Respiratory passages with a subsequent bronchopneumonia in a weakly infant. Frequently cough becomes a distressing symptom, physical examination of chest fails to reveal anything or an isolated rhonchus may be heard, nevertheless the pneumonic process is in action.

There may be little vomiting after feeds, in fact vomiting may not constitute a prominent symptom. Diarrhoea or "intestinal Dyspepsia" in which there is no vomiting, or it is so infrequent as to be of secondary importance, may occur - the dyspeptic symptoms manifesting themselves in connection with the intestines. The motions become loose, more frequent, offensive, contain mucus in them (this is frequently termed "choppy") and in consequence the buttocks become red and excoriated.

The urine on microscopic examination reveals an intermittent pyuria, abundant pus cells for a period and then a clear field. This phenomonon is quite transitory and soon re-appears again with a marked number of pus cells. I have found daily examinations of the urine of invaluable assistance and it serves too to demonstrate the intermittent nature of the pyuria.

The temperature varies from normal to $100^{\circ}$ to $101^{\circ}$. It is usual to find return of pyuria, or discharge from eyes or ears, or fresh septic spots, or intestinal flare ups - accompanied by rise in temperature.

The blood shows a mild anaemia, haemoglobin lowered but not to an appreciable degree

In all cases the liability of mouth infection must not be neglected. Stomatitis very readily occurs in these infants and it is not infrequent to find ulcers on the palate even under most careful nursing precautions.

If the bowel disorder occurs in the 1st ten days after admission to hospital I think it is quite legitimate to assume that this is an hospital infection - but the bouts of intestinal irritation which recur from time to time are merely due to irritation of normal inhabitants or to organisms arising from the septic process already in operation in other parts of the body. I do not think any case could more aptly illustrate the clinical picture described than this one. (Fully described later), and referred to in case II and chart 2c.

Emily R. aged 12 days on admission on the 4-4-33. Premature infant weighing 4 lbs 5 ozs. with slight icteric tinge of skin and 2 septic spots one on the cheek and the other on scalp. The infant had been breast fed for 7 days, then refused to suckle and was put on to the bottle with Angel milk until admission to hospital, when it was found advisable to catheter feed. This was done wholly for 14 days and partial catheter feeding carried out for another 4 weeks + bottle.

On the 9-4-33 (5 days after admission) urine showed occasional pus cells , a slight increase in weight and no temperature.

On the 17-4-33 (13th day) several septic spots appeared on the right cheek, stools all along 3-4 per day, relaxed, and occasional vomits for past few days.

20-4-33 (16th day) another crop of spots appeared on the left cheek, eyes commenced to discharge, urine did not show anything abnormal but the stools were reported as abnormal.

1-5-33 weight had gone up. Pyuria appeared in the urine, stools still abnormal, occasional vomits - this was followed by a good spell with an increase in weight up to 5 lbs 3 ozs, normal stools, no vomit and clear urine. The resistance of the infant had apparently increased during this good spell, for despite pyuria on the 19-5-33 the weight was well maintained and the haemoglobin 70%, stools relaxed and vomits occasional.

25-5-33 a remission occurred, rise in temperature to a 100°, discharging ears, septic spot under chin, abnormal stools, followed in a day or two by abundant pus in the urine and further septic spots on the scapula and behind the right ear. After this progress continued, rise in weight chart despite intermittent pyuria up to 6 lbs. 13 ozs, pyuria

varying from occasional cell to an abundant amount of pus cells in the urine.

18th & 19th century literature, on the subject of Sepsis.

It is indeed interesting to review literature from the 18th & 19th centuries and to trace the allusions made to septic infection in infant textbooks of these periods.

In a survey of the literature on this subject of infection evidence of the recognition of sepsis and its spread in infancy is shown by Michael Underwood as early as 1789 in his treatise of diseases of Children (1).

In discussing haemorrhage from the naval he says:

"I have two or three times seen a complaint at the naval of newborn infants, which is scarcely worthy of mention - this is an oozing of blood from the part after an unkindly separate of the chord and is owing to the shooting up of a soft fungus which prevents the skin from covering the divided vessels in the manner it otherwise does".

Though this was not considered of serious import, infection at the umbilicus was apparently noticed by the author. The question of a severe septicaemia from the umbilicus is not discussed, nor the localised skin sepsis at umbilicus, as of itself sufficient to produce ill health in the infant.

Transmission of sepsis from the umbilicus has always been considered a grave event, but mild umbilical skin sepsis may act as a precursor of general ill health with dyspeptic and urinary symptoms in the infant so affected and may also occur in conjunction with other local disorder, namely, vesicles of the skin and other parts, boils, abscesses and discharges from eyes and ears.

Another instance of gross infection with abscess formation in a newborn infant in the British lying-in hospital received particular comment by the author:

"In this instance the infant was not only born with hard and sublivid inflammatory patches and ichorous vesications about the belly and thighs - but other spots were already actually in a state of mortification. An eschar soon spread to near 3 inches in length, upon the spine of the tibia and other smaller ones appeared about the

"legs,on several of the toes and the fingers. The parents of this child appeared to enjoy good health, and the mother had plenty of good milk which her infant was fortunately able to take in great quantity".-------"The infant, however, lost two joints of one of its fingers and the 5th of another, all the other fingers and toes, contrary to expectation throwing off the mortified parts, were recovered entirely, and the child was sent out of hospital perfectly well and I had the satisfaction of seeing it in good health several months afterwards."

This case is of great interest and is classed by Underwood (2) in the chapter on "Erysipelas Infantilis". The infection must have been a severe streptococcal one, transmitted to the infant in utero. It is not only interesting but surprising to note that the mother is reported as perfectly healthy, though the infant was already infected at birth. The puerperal history has, however, not been referred to, in consequence of which the source of infection is rather puzzling. In this case the infant was evidently well nourished and its resistance to infection great, as it made a complete recovery - a rather unusual feature of so severe a septicaemia.

Another instance of the spread of infection is discussed by Underwood (3) under Aphthae or Thrush. I refer to this important paragraph as illustrative of the spread of infection from one infant to another in hospitals in France and other countries, which were criticised by Underwood in his lengthy description on this matter.

> "It is indeed a much milder disorder in this island than in most parts of the Continent - particularly in France where it reigns as a malignant epidemic, especially in the Hotel Dieu and Foundling Hospitals, known by us as the names of Muguet and Millet".

Underwood attributes the greater incidence of this condition in hospitals in France to congestion... less clean apartments, foul air, and consequently too much contagion: "this is remarkably the case in infants, whose temperament is a singular union of debility and spasm".... "The Muguet is a striking instance of the above mentioned tendency, it being altogether a hopeless disease, which though distinguished by this name, appears to be a malignant thrush and is frequently attended with

"a species of infantile erysipelas. When so accompanied, it is said to be constantly fatal, unless the hard and tumid parts terminate in the benign abscesses, and suppurate kindly, which is rarely the case, they being more commonly found to mortify."

This shows striking relationship of streptococcal infection with abscess formation in other parts of the body along with unhealthy condition in the mouth. In septic infants the mouth often becomes ulcerated and sore, and this "thrush" part of the syndrome of sepsis. It is quite likely that a percentage of infants admitted to these hospitals were thoroughly septic beforehand and under an unfavourable regime of overcrodwing, foul air, etc., transmitted the disease from one patient to another - and with unclean teats produced a secondary thrush on which all attentionwas focussed.

Of skin manifestations the red gum or benign eruption as it is called resembles boils and abscesses of the skin.

"The red gum is efflorescence on the skin, appearing usually in small spots, often confined to the neck and face, but at other times it extends to the hands and legs and even the whole body, appearing in very large patches and sometimes raised above the surface. It will likewise appear in the form of small papules filled with limpid or sometimes a purulent or yellow liquor, at least I have never known what name to give this kind of eruption, but that of rank red gum, as it happens only in the month, or soon afterwards and never gives any trouble".

This description tallies remarkably with the appearances of skin sepsis in infants, little discrete spots, which become raised above the surface and are filled with fluid or pus. Another important observation is its occurrence in the 1st month and Underwood (4) states that he has never known it give rise to trouble - this may of course be due to mild forms in well nourished infants, who are able to overthrow the infection or perhaps establish an immunity very early in life. It is difficult to authoratively state when such an immunity is established, but clinical observations shows that in later infancy, by that I mean, the second half of the 1st year if the infant is well

nourished and well looked after, it develops a resistance to infection, so that if pus occurs in the urine, a discharging ear, little skin sepsis, the infant is able to overcome the infection and does not show any clinical signs of ill health.

In 1848 Dr. Charles West (5) published a series of lectures on diseases of infancy and childhood in which he fully discussed dyspepsia and diarrhoea, but did not attribute septic factors at work in either of these conditions. In a perusal of his work sepsis is entirely undiscussed, so that I must conclude that this question did not play any part in infantile conditions in the mind of the author.

In 1889 the subject of dyspepsia fully and admirably reviewed by Dr. Henoch (6), gives a new conception of the disease. Dyspepsia is discussed not only from the dietetic standpoint, but also from the associated factor of infection. This theory is substantiated by Dr. Henoch in the following remarks, and I think it is described in masterly style from the clinical standpoint.

"Deficient and unsuitable feeding is not the only thing to be blamed in these cases. Second to it - though still very potent - come the foul air breathed by these children in crowded rooms filled with emanations of every

sort and into which it is impossible to bring fresh air regularly, deficient cleanliness and neglect of the first stages of the diseases to which children are liable. Some of these causes are active in Children's Hospitals also - more so in foundling institutions - and in these therefore one has abundant opportunity of observing the various results of such unfavourable conditions. These results we group together under the name of atrophy. The clinical picture of this morbid state, which may appear in its most terrible form at any period of infancy or even in the newborn varies naturally according to the stage at which one sees it. Soon, however, it becomes evident even without this that children are falling off, their fat steadily disappears, the skin on the face and on the whole body becomes flabby, wrinkled, yellowish and not infrequently there is a brawny desquamation of the epidermis. At this stage the organic functions, specially those of the alimentary canal, may remain quite uninterferred with or almost so and by suitable nourishment and care we may still avert the threatened exhaustion and initiate recovery. In the majority of cases, however, the possibility of such a favourable term is excluded by their poor

"circumstances, functional disorders of the digestive organs (especially vomiting and diarrhoea) are added and finally the last stage develops which precludes all hope and leaves to the physician when he sees a number of such children together, (as e.g. in my ward) only sadness and resignation." .....

In the further discussion of the above Henoch says:

"In these cases the skin not infrequently is erythematous on the genitals, anus and heels and in various situations even on the scalp - it is the seat of abscesses and boils of various sizes. The mucous membrane of the mouth and palate is more or less extensively coated with thrush."

His observations closely correspond with the clinical picture described in a typical case of sepsis in infancy, it is interesting to note the importance attached to the progress of septic conditions in the dyspeptic infant. The symptoms of dyspepsia and sepsis in infancy appear in some cases to be almost indistinguishable and may give rise to difficulty in diagnosis. However, Dr. Henoch, had correlated the two conditions and emerged them into one clinical picture accepting

septic processes as part of the disease dyspepsia.

In 1899 a small volume on diseases of wasting in infants and children was published by Dr. Eustace Smith (7) - in this volume dyspepsia and marasmus are included, but infective processes do not appear to enter into theories of these illnesses. Indeed infection is not treated with special reference to infantile conditions in any form or manner, I can therefore conclude that the significance of this played little part at the hands of the author in the production of infantile disorders.

20th Century Literature on the Subject.

The present century opens up an era of investigation in infant and child problems - much has been written - much discussed - but still much remains in the field of research in sepsis from which so many of our infants succumb. It is my duty now to consider in more detail some of the statements made in my introductory remarks. In this respect I have resorted to several emminent pediatric works for support of my arguments. They have enabled me to advance some opinions with more conviction. Amongst these authorities are Abt:Still: Thomson: Von Reuss: Garod,Thursfield & Patterson: Feer: Pfaundler and Schlossmann:

Holt & Howland and most recent of all Parsons & Barling: Holt & McKintosh all of which form a complete survey of every aspect of infantile disorder recorded in literature.

It is indeed disappointing to find so little mention made of mild sepsis, which remains a rather unrecognised clinical entity. Indeed in many infantile institutions mild sepsis plays no role in the classification of the diseases, in some it is entirely overlooked with a result that statistical evidence on this subject is sadly lacking.

Thorough investigation might reveal the existence of this condition to an alarming extent in foundling institutions which are overcrowded and in Children's Hospitals where these cases are mixed with all varieties of disease and treated without special precuations. The only statistical evidence of the existence of all forms of sepsis severe and mild has been given to me by Dr. A. Ogilvie of the Babies' Hospital, Newcastle-on-Tyne. This is as follows:- over a survey of 1144 cases in 10 years sepsis constituted 180 of the cases, that is, 1/6th of the admissions were due to sepsis in infancy.

The Aetiology of Infantile Sepsis.

The infection of the child by septic organisms may occur in three stages.

I. During intrauterine life.

II. Intrapartum - this being considered as the stage between rupture of the membranes to the end of delivery.

III. Postpartum.

How does this intrauterine infection occur? It occurs either through the placenta or through the liquor amnii. Abt (8) believes that "the infections which take place in utero may invade the blood stream of the foetus directly or through a diseased placenta, or gain access through the contaminated liquor amnii." These infections through the liquor amnii he maintains are secondary to the growth of bacteria in the fluid. "The liquor amnii may be infected through the intact membranes by way of the vagina or from the abdominal cavity by the fallopian tubes or probably most of them infection takes place after premature rupture of the membranes".

Feer adheres to this 3 stage infection theory, but considers the postpartum period much the most important and more frequent occurrence.(9).

Pfaundler & Schlossmann (10) and Von Reuss (11) endorse the above views of Abt and Feer.

It is all important to recognise the fact and my observations lead me to conclude that even though the infective factor has been present at birth, the disease may lie latent for a time and then light up during the 1st year of life. This fact is supported by Von Reuss, who says that in "those cases where pathogenic microorganisms are transmitted through the placenta of the Mother to the foetus, the infection of the foetus does not lead straight away to specific disease. Septic diseases of the Mother may injure the foetus in many ways, either to harm to its development from deficient nutrition - through transmitting of toxins from maternal to infantile circulation or through infection with the organisms of the disease".

Two excellent examples of intrauterine infection are afforded in the cases of Frank H (Case 3 Chart 3C) and Richard T (Case 7 & Chart 7c.). In case 3 symptoms manifested themselves at 8 months, the Mother having been a case of puerperal sepsis and case 7 at 6 weeks in which case the gynaecological diagnosis of the Mother was mild septicaemia following infection of the placental site.

The baby may become infected in its passage through the vagina , the maternal vaginal organisms are thus easily transferred to the infant. In these cases there is generally at first a local condition, which like sepsis, acquired postpartum, may form a point of origin for a general infection (Von Reuss). After birth the infection may take place very readily and Abt summarises this complexity of factors in its production in a few words;"After birth the risk of infection is proportionate to the skill exercised and the care in carrying out prophylaxis".

In the puerperium septic organisms may be derived from the lochial secretion of the infected women, their virulence may be preserved even in the dried condition for a period,and they may become mingled with dust and inhaled by children. In this way the upper respiratory passages, may become involved and then infection extend further down and reach the lungs. Trauma to the skin, careless cleansing of the mouth, failure of strict aseptic precautions on the part of the nurse, failure to observe hygienic conditions and a multitude of other factors, incubate disease and form a favourable nidus of growth of microorganisms.

Age: From birth to the 1st year. Chronic forms may continue beyond the 1st year of life.

The sex incidence: The disease appears to affect both sexes equally.

Seasonal incidence: Sepsis occurs with equal frequency in summer and in winter, though respiratory affections are more prone to occur during periods of exposure to cold in weakly infants in winter.

Tuberculosis; does not appear to have any relation to the disease, in all my cases, the Mantoux has been negative.

Social Conditions play a very important part in the disease. Those in affluent circumstances are spared, whilst their less fortunate brothers and sisters are called upon to fight organismal invasion as soon as they enter the world. Poverty and its attendant factors of overcrowding, filth, are important predisposing factors in the production of infection and resultant ill health.

Weakly premature infants may be rendered more liable to sepsis, though this is not at all a constant feature of the disease.

Bacteriology: All are agreed that the newborn child has little defensive power against micro organismal invasion - indeed the newborn infant is prone to septic infection and acts as Abt ably describes it "as a ready host and an easy prey for microorganisms, which ordinarily meet with sharp resistance when attacking older children". The actual organisms or their toxins may be responsible for the production of disease. According to Schmidlechner a part of the toxin is transmitted from the maternal blood to that of the foetus and causes the same disturbance of function in the child's as in the mother's organs.

Once the disease is in progress the most commonly found offending organism in mild sepsis is the staphylococcus aureus, which has been demonstrated in cultures from boils and abscesses, the pus of which has been subjected to bacteriological examination. In one case contamination with the surface from a boil on the scalp produced a growth of staphylococcus aureus and albus - however, every other growth of skin lesions has been of the nature of staphylococcus aureus.

When the urinary tract is involved Bacillus coli has invariably been responsible for the damage caused, cultures of urine have rendered

growth of B. coli and enterococci in some cases. The organisms isolated in faecal examination belonged to Morgan No.I bacillus group - streptococci have occurred too - in the examinations Enteric group, Dysenteric group, have been excluded in each case.

Aural discharges have shown Bacillus proteus.

It is necessary here to mention that Bacillus Friedlander, B. pyocaneus and pneumococcus are all to be found as well in various cases - though pneumonia per se, is not considered in connection with mild sepsis, it is often superimposed upon an affection of the nasopharynx and extends down to the lungs. The infection may be monomicrobic or polymicrobic, that is, either the staphylococcus may be responsible for the disease or the staphylococcus and B.coli together, or any of the organisms under consideration.

Paths of Entry.

Two important factors operate in producing sepsis in infancy.

I. The Low Natural Immunity or lack of resisting power.

II. The existence of unguarded portals, by which microorganisms gain admission - chief of these being the umbilicus, digestive tract, mucuous membrane of the mouth, the lungs.

There are an equal number of sponsors for the incidence of importance of each portal mentioned.

The Umbilicus as the chief and most important portal of entry is held by many - Feer (12) specially stresses its importance and is supported by many others, Holt and Howland (13) Holt and McKintosh (14), Spence (15), Thursfield, Garod & Patterson (16), Donald Patterson (17), Pfaundler & Schlossmann (18).

The damage that may accrue from umbilical infection is variable, it may be very mild and fleeting, or the starting point of a severe streptococcal setpicaemia, which endangers the patient's life and invariably terminates in death.

Von Reuss considers the entrance of sepsis to the oral mucous membrane of principal significance, next to the oral mucous membrane the nasal and pharyngal mucous membrane. The middle ear may according to this author also be the primary seat of infection.

Frequently minor infections result from vaginal secretion in the conjunctiva and in the vagina of the child. Rarely do these penetrate further than the surface. According

to Von Reuss (19)"the bacteria of the vaginal secretion may get into the child's mouth and from thence either directly or through stomatitis they may penetrate the body - they may be swallowed or aspirated to infect the lungs - or may be absorbed into the organism through the intestinal canal, or through injury to the skin."

Though Von Reuss states this, it has always occurred to me as surprisingly strange that vaginal infections do not penetrate and invade the rest of the body. They either attack the conjunctiva or the vagina of the child and remain localised in these parts - but I have not seen their spread through the mouth to the rest of the body, and therefore do not subscribe to this view advanced by Von Reuss. Little resistance to the invasion of bacteria of any marked virulence is offered by the lungs, the mucous membrane of the mouth, the digestive tract and the skin of the newly born. The skin offers a fruitful source for penetration of organisms and their toxins - this is all too apparent when one considers that the surface of the skin in the newborn is unprotected by a true horny layer and consequently easily traumatised during manipulation at birth and in cleaning, when abrasions are apt

to result and readily become infected.

Pfaundler & Schlossmann consider skin infection second in importance to infection of the umbilicus. Feer (20) says:

"The general skin surface is subject to so frequent and so numerous wounds, erosions, rhagades, intertrigo, that during early days of life many opportunities of infection are offered. Usually only local disturbances, such as furuncles, abscesses, phlegmons occur".

Another important source of infection is via the pharyngeal tonsil and this may be the primary septic focus - the infection may be transmitted through the nasal mucous membrane, the tonsils or the ear. (Feer). In these cases where infection occurs in the upper respiratory passages a rapid spread to the lungs may take place. In the same way a generalised infection may occur from the spread of B. coli, rarely is it the result of an ascending infection through soiled napkins coming in contact with the vagina.

The devlopment of multiple skin abscesses is favoured by free perspiration and soiling by bowel movements and they are due to

exogenous infections, which develop as a result of lowered immunity.

The digestive apparatus may be implicated by organisms entering the part, or by irritation of the mucous membrane, this irritation resulting from physiological irritative catarrh.

Holt (21) suggests that in rare cases the mother's milk may be the source of infection, Feer refutes this theory in the following remarks, that infection by way of the mother's or cow's milk containing germs is not tenable and says: "Undoubtedly disturbances of nutrition increases the liability to infection to a great degree by reducing the minimising forces of the body and therefore infected disease is more common in artificially fed children".

Women suffering from mastitis or septicaemia, and whose milk has been known to contain pyogenic organisms, do not infect the infant. This fact is admitted by Holt himself, so that little remains to be said about infection by this channel.

Fischl points out that infection from the ear may play an important part in sepsis and that the lungs furnish a more frequent primary source of sepsis than the gastrointestinal tract.

Czerny & Keller as before mentioned stress the importance of enterogenous sepsis in the newly born.

The most recent description on this subject is given by Dr. J. C. Spence (22) in his section on Neonatal Diseases in the work of Parsons & Barling. The portals of entry are considered in groups referred to in the description given above. The skin and respiratory tract are favoured as portals of entry before or during birth. The umbilicus, the skin and the mucous membrane afterbirth and institutional overcrowding regarded as a definite source of postnatal infection.

Von Reuss(23) admirably sums up the portals of entry in a very comprehensive manner.

" The newborn child is very susceptible to septic infection - the bacteria find relatively easy admission into the body, through the physiological umbilical wound, through the easily vulnerable mucous membrane - the delicate desquamating skin, the true horny layer of which is absent and through the functionally incomplete intestine. The bacteria and toxins easily become disseminated in the body, as the

phagocytic activity of the leucocytes is still deficient. Enlargement of the lymphatic glands which to a certain extent, check the infection, is generally absent in the newborn or slight.

Besides all these factors there are other excitants which produce the disease, these lie in the hands of the physician, the attention to cord dressings and instruments.

The Pathology of the Disease.

Little opportunity arises for pathological study of mild forms of the disease, this aspect rests with a knowledge of the severe forms to which infants succumb.

The regional lymph glands in mild forms may show slight hypertrophy or entirely fail to do so, as infants have a poor defence against organismal invasion.

Septic occurrences in any part of the body may be present. Otitis media : rhinitis: conjunctivitis: bronchitis: gastroenteritis: pyelitis: boils, abscesses and septic skin lesions.

Acute splenic tumour so pathonomic of septicaemia of the newborn is not a feature of the mild forms of the disease. The spleen may be palpable within physiological limits but little else beyond that occurs in mild sepsis. The disease may remain localised to the seat of infection

or spread from point to point via the blood stream.

PRIMARY FOCUS.

The detection of the primary focus may in some cases present great difficulty, in fact it may be unknown, in consequence of which it is referred to as cryptogenic sepsis.

Where the renal tract, ear and skin are simultaneously invaded, the primary focus may be one of three points of origin - though the ear or skin would suggest the seat of entry and haemotogenous extension to the kidney.

In some cases a discharging ear may commence first and then respiratory complications supervene, in this case one naturally concludes that the naso pharynx has been the centre of activity from the onset of the disease. Where the skin has been the seat of abscesses and pyuria resulted, the spread is of haemotogenous origin, and so on - certain deductions are made possible, others are purely a matter of conjecture .

The Clinical Picture, has been presented in the Introductory chapter, yet some further points require elucidation here.

It must be concluded from my preceding statements that disease described by me is of the mild type, the course of which is extremely variable and of a chronic nature; or a subacute type which is merging into a state of chronicity. This fact has been particularly recognized by Von Reuss (24) and Pfaundler & Schlossmann (25) in support of which the latter describe different types. One of these is the type where the disease may run its course without any symptoms, in other cases the course is stormy with the result that these cases are classed as acute gastroenteritis, and others resemble pneumonia from the outset. Von Reuss (26) says:

"Apart from those violent cases which lead to death within a short space of time, there are subacute and chronic forms which last for weeks. Sometimes the disease pursues its course in the most alarming manner with high fever and all the described general symptoms, in other cases the form of the disease is so indefinite that we may finally be in doubt whether a general infection is

"actually present or merely general constitutional weakness, the condition resulting from underfeeding or onset of nutritional disturbance."

The disease may be primary or secondary to a pre-existing disease. Usually it is caused by a single microorganism whilst at other times the infection may be polymicrobic. Pfaundler & Schlossmann (27) maintain that the majority of infections are hetero-infections, that is, the organisms have been introduced from without. In mild cases the disease may be very slow, each day succeeding the other with uneventful similarity - a contra distinction to the advancedtype, where events are rapid and dramatic.

The Clinical Picture may be grouped according to the system implicated, and may vary from gastro enteritis to respiratory infection.

The forms are classified as -

I. Cutaneous form.
II. Respiratory form.
III. Alimentary form.
IV. Renal form.
V. Aural form.

Thomson (28), though he does not discuss infantile sepsis regards dyspepsia as a result of two factors -

I. Either unsuitable food. II. Lowering of the child's strength by parenteral complications, for example, respiratory catarrh, otitis or cystitis.

The symptomatology advanced in this type of case corresponds closely with that of mild sepsis in infancy.

"The child loses colour and weight slightly and becomes hollow eyed, restless and irritable. The pulse, respiration and temperature usually remain normal, but there may be a degree or two of fever. The abdomen is distended, motions numerous 5 or 8 in a day."

Still, (29), has little to support this theory under discussion here.

View from Current Journals and Magazines.

The existence of malnutrition, dyspepsia and marasmus is in no way intended to be obscured by over-estimating the presence of mild sepsis. "It is probable that a large number of cases of so-called malnutrition and gastroenteritis seen at the age of 2 to 3 months had their origin in an unrecognised septic infection shortly after birth." - says Dr. J.C. Spence (30), and it is this view that possibly explains so many of our "failure to cure" cases of malnutrition.

Current literature has made a strong plea for the inclusion of other factors in dyspeptic diagnoses. Heiman & Cohen (31) in reviewing the literature on the subject of marasmus found that chronic infection was recognised as an aetiological factor of the condition - but the disorder was stated to be caused by constitutional metabolic aberration or by a series of improper feedings. From their observations they conclude that "with the exception of congenital anomalies and poor feeding, which form a minority of these cases, the metabolic abnormalities are due to chronic infection". The chemical manifestations according to these two authors are identical

in marasmus and in sepsis - in both these conditions there is loss of water, nitrogen and salts, relative acidosis, increased excretion of organic acid, increased ammonia coefficient of the urine and in addition the fever in infection raises the basal metabolic rate. They believe that infection is by far the most important single factor in the evolution of marasmus.

"When the infection was cured or alleviated the loss of tissue ceased and a positive nutritional balance was attained. In this respect the relation of infection to marasmus bids fair to equal the role it plays in the causation of alimentary intoxication, and observation that has justly received much emphasis in the last few years.

Clausen (32) considers poorly nourished infants specially prone to respiratory infections and that vitamins increase the resistance of the infant. This has been proved by animal experimentation. Respiratory infections, he concludes, are due to two factors (1) presence of virulent microorganisms, (2) the lowering of the nonspecific resistance to faulty organisms.

The ear as a great source of infection has been fully discussed by American pediatricians and laryngolists. Lyman (33) suggests a close relationship between infections of the middle ear and gastrointestinal disorders in many cases. Of 70 consecutive necropsies, supposedly due athrepsia and infantile diarrhoea Renaud examined the middle ear and mastoid;— 30 cases were diagnosed as having otitis media ,40 were overlooked. "The final diagnosis in practically all cases was infantile diarrhoea".

Alden and Lyman (34) advise early operation on the mastoid and state that early surgical intervention reduces the mortality rate to 50%. Lyman asserts that unless the condition in the ear is relieved , the disturbance in the gastrointestinal canal does not subside. In some cases a fatal termination results even when the drums are opened and drainage is maintained. These failures are ascribed to absorption of toxic materials and inadequate drainage. Lyman emphasises the greater importance of operation on the mastoid, when gastrointestinal symptoms co-exist. In 17 cases operated on pus revealed different organisms, though haemolytic streptococcus predominated. He concludes that while

"it may be possible that haemolytic streptococcus or some special strain of organism is a special aetiologic factor in the production of gastro-intestinal symptoms in these cases, it is certain that many other organisms can produce the same effect".

Marriott (35) says that in cases of vomiting and diarrhoea where suitable food fails to bring about cure, there is likely to be evidence of infection which is shown by leucocytosis and irregular temperature or both. The infection may have come from the respiratory tract and subside, but careful investigation reveals infection in the middle ear. In some instances paracentesis improves the nutritional condition, in others a slight or temporary improvement may occur, and finally the infant succumb to gastrointestinal disturbance. Pus from the mastoid has shown haemolytic streptococcus. In fact Marriott suggests that where there is ear discharge or an infection of the paranasal sinuses, surgical drainage should be instituted. One cannot help feeling this is an extreme view to follow and cannot be recommended without mature consideration of each individual case.

Bridgeman (36) declares that if suitable diet is given and infants do not respond, a focus of infection must be sought after. The common foci he finds in the middle ear, the mastoid sinuses, adenoids, tonsils and renal pelves. "As far back as 1898, the association of purulent otitis media and mastoiditis with fatal gastro-intestinal disorders was remarked by a pathologist at the necropsy table".

According to this author antrotomy has produced gratifying results, consequently this method of treatment is recommended, as well as the fact that physical signs of mastoid infection may or may not be present and this is the only way of its detection.

In 6 such cases 4 recoveries were reported. 3 cases of otitis responded to myringotomy and 1 case of maxillary sinusitis to puncture and irrigation.

Lyman, Alden, Marriott and Bridgeman appear to have a good deal of evidence on the primary otologic focus. In this respect there are three arguments, which have been advanced by one or other of these authors of the subject in support of their views.

I. In a number of infants a history of infection of the upper respiratory tract antedated or appeared concomitantly with intestinal symptoms. However, we are all conversant with the fact that infants are prone to respiratory infection without any aural involvement whatsoever, the pharyngal tonsil may be a more significant factor in production of respiratory complications than the aural path.

II. Much is made of the fact that on necropsies of infants with gastrointestinal symptoms - the middle ear and mastoid cavity were in these cases filled with purulent exudate. This can,however, occur under purely physiological conditions, in fact some people incline to the view of its existence as a purely physiologic nature. The bacteriological examination of pus from the ear does not correspond with the bacteriology of the intestinal tract disturbance, though it must be remembered too that the infection is often polymicrobic as before stated.

III. Good results are claimed by many after operation on the ear.

It is rather refreshing to find that Druss (37) is not a protagonist of surgical intervention on the ear as a cure of the gastrointestinal condition.

He says:

"The preponderance of evidence favours the view that the otitic condition is not the aetiologic factor responsible for intestinal intoxication. An infection of the ear may influence the course of the illness - the causative factors must be looked for elsewhere, consequently in the treatment cures cannot be hoped for by operations on the middle ear and mastoid process".

Druss found that a large number of infants succumbed to these operations.

A discharging surface caused by paracentesis in an ill infant is to be deprecated - for often such infants are poor surgical risks and succumb to even the smallest procedure. Then too the risk of skin infection by discharge pouring down tympanum and pinna is not to be forgotten. In cases where the ear is definitely the primary source of infection, surgical intervention may be considered - but the routine practice of antrotomy and myringotomy, where ear drum has lost its lustre is by no means a method, which should be employed by pediatricians in the hope of curing gastro-intestinal symptoms.

Ernberg (38) emphasises the great importance of routine examination of the pharynx,

the nose and accessory organs, as these play a great part in the production of infections in infancy and particularly in dyspepsia, chlorea infantum and septicaemia, he says:

"It has long been known that various parenteral infections may bring about dyspepsias and allied diseased conditions in infants that from a practical point of view, far the most important form of these parenteral infections is nasopharyngitis."

In many dyspeptic cases Ernberg has found acute nasopharyngitis with complications from the ears on admission of patient to hospital.

It is interesting to find too that he subscribes to the view of secondary infection of the alimentary canal and in consequence says:

"Alimentary factors may influence the organisms in an adverse manner, but rarily themselves give rise to acute dyspeptic disturbances or acute exacerbations of chronic disturbances. For excitation of these symptoms it requires in far the greatest number of cases, an infection usually originating from the pharynx."

Thus the primary portal of entry according to Ernberg is the pharynx. Reference too is made to the danger of overcrowding and the spread by drop contagion of nasopharyngeal infections, which

are responsible for epidemics in institutions.

Findlay (39) discusses otitis media as an aetiological factor in gastroenteritis and has in many cases found pus in one or both ears. He says:

"Although the gastrointestinal symptoms may dominate the clinical picture, when these are secondary to some nonalimentary disease, they are never of the severity of true gastroenteritis, nor are they usually accompanied by the coma, dehydration and Hippocratic facies so characteristic of the condition".

The results obtained from attacking the ears are quite inconclusive according to this author. He seldom found any immediate response from interference specially with enteritis as a dominant feature and concludes that the course of disease did not appear to be materially affected. "Indeed, at times, we got the impression that we had done harm by our interference".

Finkelstein (40) is very emphatic that otitis media is not the cause of gastroenteritis and advised against interferring with the ear unless local symptoms demanded it.

Asherson (41) considers that many diverse views exist between the relation of the ear condition and gastrointestinal disturbance. He suggests otologic examination in cases of gastroenteritis with a view to detecting infective process in the tympanum or antrum. If myringotomy reveals pus, he advises antral drainage. There are many difficulties in reviewing the position, for even when the tympanic membrane remains an apparently normal colour, there may be deep seated pus as well.

Cameron (42) considers the special susceptibility of infants to infection due to structural peculárities of the skin and the mucous membrane and also to lack of antibodies in the blood increased by abandonment of breast feeding. He holds the view that the umbilicus may often be secondary to a general infection and that eczematous and intertriginous erosions of the skin rival the umbilicus as a portal of infection. The intestinal symptoms are considered secondary to the infective factor.

Dunham (43) has reviewed a series of infants with severe septicaemia and in each case blood cultures have been done with varying results. In 30 of 39 reported cases signs of localised

infection were found, 19 of these showed 2 or more foci.

Castle (44) reports a c ase of cutaneous lesions in an infant which commenced at 9 days and on the 18th day there were several abscesses and otitis media. The cultures from abscesses correspond to findings I have observed in my cases, the infecting organism being of the staphylococcal type and staphylococcus was on 2 occasions isolated in Castle's case by blood culture.

The concensus of opinion favours the ever present possibility of infection as a causative factor of ill health, dyspeptic symptoms and failure to progress in infancy. The importance of focal sepsis cannot be too much stressed as advocates of this theory suggest. The infection may be aural, cutaneous, respiratory, alimentary, renal and any of these may be set into activity by a lowered resistance.

## THE HAEMOTOLOGY OF INFANTILE SEPSIS.

The work on this subject is comparatively new as indeed is infantile haemotology in general. Literature does not prove any representative and systematic haemotological work incases of mild sepsis in infancy. An attempt to elucidate this problem is made here. The selected cases are representative of every group of mild sepsis in infancy.

They are as follows:-

I. Case I, Charts 1a and 1b.
This case presents features of skin lesions, intermittent pyuria and occasional gastrointestinal disturbance.

II. Case II . Charts 2a and 2b.
This case presents following features:- Skin sepsis, intermittent pyuria, gastrointestinal disturbance and discharging ears in a premature infant.

III. Case III, Charts 3a and 3b.
An older infant with septic manifestations following one another at frequent intervals - discharging ears, interstitial pneumonia, abscesses of skin.

IV. Case IV, Charts 4a and 4b.
This case presents numerous skin abscesses, respiratory involvement, and occasional pyuria.

V. Case V, Charts 5a and 5b.
This case presents mild skin lesions, discharging eyes and inability to feed, "marasmic" looking.

VI. Case VI, Charts 6a and 6b.
This case present gastrointestinal upset, peeling of skin, failure to gain weight.

These cases embrace every manifestation of mild sepsis referred to in the introductory remarks on the subject.

In each case weekly blood examinations have been carried out extending over a period of time, in some instances blood smears have been taken with more frequency if anything untoward has occurred.

The blood examination consisted of the following estimations:-

I. Haemoglobin.
II. Red Blood Count.
III. White Blood Count.
IV. Estimation of Colour Index.
V. Reticulocyte Count.
VI. Differential Count.

In each case blood was obtained from the heels of the patient provision having been made to have the foot warm before commencing.

The prick was carried out by means of a triangular needle, sharp stab has enabled sufficient blood to exude for the necessary investigation. The haemoglobin estimation has been done in every case by the new Sahli method.

Supravital staining for the reticulocytes has been done by Cresyl blue method and in each case 600 cells have been counted.

The Differential Count has been carried out by blood smears stained with Leishman's stain, in each case 200 cells were counted, division of the cells into their groups made according to the Schilling method - which allows identification of the primitive types of the neutrophile series. By this method the neutrophile cells are classified into four groups: (1) Myelocytes, (2) Metamyelocytes, (3) Band forms, and (4) Segmental forms. This has rendered valuable help in watching changes in the blood picture at various stages.

6 cases have been done and followed throughout the course of the illness instead of occasional and spasmodic attempts at blood counts from time to time. The clinical picture has

been correlated with the haemotological findings and studied from this point of view as will be seen in the accompanying charts.

THE HAEMOGLOBIN LEVEL IN THE SELECTED INFANTS.

It is necessary to compare the haemoglobin in disease with the findings in healthy infants to make any deductions whatsoever.

All observers have found the haemoglobin level high at birth but wide variations exist among different investigators and the difference between highest and lowest levels is 65%, however, after this period the results are more consistent.

Average haemoglobin levels in healthy infants from standard textbooks and works on this subject.

Holt and Howland (45)(1926), state that the haemoglobin lies between 65-85% and consider 75% low limit in healthy children.

Holt and McIntosh (46) (1933). Shortly after birth haemoglobin begins to fall. This decrease is at first rapid, but gradually becomes slower. The low point is usually reached at about the middle of the first year , but there is little increase until after 2nd year.

In children under 2 years old the usual range of haemoglobin is between 65-85%.

Thursfield (Garrod, Batten, Patterson 1929) (47), state that the haemoglobin level sinks steadily to 70-75% sometime before 6 months of age and remains at that level during the whole of infancy and does not as a rule increase until the end of the 2nd year.

Feer (48) (1922), during the 1st two weeks of life the normal haemoglobin content is about 36% greater than in the adult. From these high values the percentage begins to diminish at once and after 2 weeks the fall is very rapid. By the 5th month value reaches very nearly the minimum and is far below the value of adult life.

Von Reuss (49). As a general rule it may be considered that the haemoglobin content begins to fall from the very day of birth or after a slight rise of 3 to 4 days duration. The fall is regular and the value normal to the infantile period about 70-80% is reached in the course of 2 to 3 weeks.

Parsons and Barling (1933) (50). Haemoglobin rises to about 150% until the 4th day (Forkner) and then falls. The haemoglobin drops to 70-75%.

Schilling (51): soon after birth the erythrocyte and haemoglobin values begin to fall slowly. About 14 days after birth there are still higher haemoglobin values than later on.

Elvehjem, Paterson, Mendenhall (52) find their results a little higher than those given By H. M. Mackay. The values fall rapidly from birth to the age of from 8 to 12 weeks, rise from 12 to 24 weeks, fall slowly thereafter and reach a low level at about 1 year.

Leichtenstern (53) found that the reduction of haemoglobin was as follows:-

| | |
|---|---|
| 3 months | 95% |
| 4 " | 88% |
| 9 " | 77% |
| 2 years | 74% |
| 4 to 6 years | 76% |

The most instructive series of investigations have been carried out by Helen Mackay (54) to whom I refer in detail in connection with haemoglobin estimations. The work presented in the Medical Research Council's Report has been revised and figures adjusted.

Her haemoglobin estimations have been carried out by means of the Price-Jones-Haldane method. The "normal" haemoglobin refers to breast fed infants weighing 6 lbs and upwards at birth, and who from the period of 3 to 4 months of age and upwards were treated with iron. The standard for bottle fed babies is given as well.

| Age | Normal Haemoglobin Values | Average Haemoglobin Values - bottle fed. |
|---|---|---|
| ½ to 1 mth | 106% | - |
| 1 to 2 " | 88% | 80% |
| 2 to 3 " | 74% | 69.4% |
| 3 to 4 " | 77% | 71 % |
| 4 to 5 " | 81% | 74.3% |
| 5 to 6 " | 86% | 75.8% |
| 6 to 7 " | 86% | 74.5% |
| 7 to 8 " | 86% | 73.5% |
| 8 to 9 " | 86% | 73.2% |
| 9 to 10 " | 86% | 72.2% |
| 10 to 11 " | 86% | 70.7% |
| 11 to 12 " | 86% | 70.1% |
| 12 to 13 " | 86% | 69.1% |
| 13 to 14 " | 86% | 70.4% |

Variations in haemoglobin levels occur according to the type of apparatus used, whether the prick is made at the heel or ear and on several other factors. Birth weight is an important factor too, the higher the birth weight the higher on an average is likely to be the haemoglobin level from 1 month old and during most of the 1st year of life.

The method I have employed in every case has been The New Sahli Method. Blood is collected and converted into acid haematin by the addition to it of $\frac{N}{10}$ HCL in a graduated tube. This gives a deep brown colour with blood containing normal amounts of haemoglobin. Dilution is made with water, until the colour matches that in the standard tubes. (The apparatus used is the Sahli-Leitz with double comparator tubes and provided with an accurately graduated pipette and graduated diluting tube). The HCL is placed in the graduated tube to the mark 10, 20 ccms. of blood is sucked up into the pipette and added to the HCL in the graduated tube . The blood and acid are mixed by means of a stirring rod specially provided and allowed to stand for one minute. Distilled water is then added and the colour matched with that in the graduated tubes and the reading recorded. The reading gives the percentage of haemoglobin, and the grammes of haemoglobin per 100 ccs. of blood.

Case I. Chart 1a & 1c.

| Age in Weeks. | Haemoglobin Level. (Sahli method) % | Average Haemoglobin Values in the bottle fed. (H.M.Mackay's findings. % |
|---|---|---|
| 4 | 87 | |
| 5 | 80 | |
| 6 | 75 | |
| 6½ | 75 | 80 |
| 7 | 75 | |
| 8 | 73 | |
| 9 | 75 | |
| 10 | 80 | 69.4 |

The above findings in the Haemoglobin level are in an artificially fed infant, who has had no iron treatment at all. The birth weight was unknown, but the weight at four weeks was 8 lbs. 2 ozs. This infant despite skin sepsis of quite an extensive nature remained well nourished throughout and its resistance to infection in consequence well maintained. The above table shows that this case compares very favourably with corresponding figures given by Helen Mackay. The average haemoglobin from 4 to 8 weeks was 77% as

compared with 80% in the bottle fed series and in the 2nd month 77.5% as compared with 69.4%. This conclusion associates itself with the remarks of Mackay (55) when she says: "Most slight infections, where general health is not seriously impaired do not appear to influence the haemoglobin level. The next estimation taken after a cold in the head, an attack of bronchitis, or a slight enteritis, usually showed no drop which appeared attributable to the illness. Nor does a localised pyogenic infection, which has not lowered the general health appear to cause anaemia".

Case II. Charts 2a. & 2c.

| Age in Weeks. | Haemoglobin Level (Sahli Method) | Average Haemoglobin Values in the bottle fed. (H.M.Mackay's findings) |
|---|---|---|
| | % | % |
| 8 | 70 | |
| 9 | 78 | |
| nearly 10 | 76 | |
| 10 | 75 | 69.4 |
| 11 | 70 | |
| 12 | 70 | |
| 13 | 76 | |
| 14 | 76 | 71.0 |
| 15 | 76 | |

This is a case of an artificially fed premature infant weight at commencement of blood work was 5 lbs. 8 ozs. and iron treatment given when 10 weeks old. Here the infant exhibited a generalised mild infection with the following factors, dyspepsia, intermittent pyuria, skin sepsis and discharging ears, despite all these conditions of ill health the haemoglobin level appears to have been well maintained.

The average haemoglobin between 2 and 3 months was 73% as compared with corresponding 69.4% of the same age period given by Helen Mackay, and 76% between 3 and 4 months as compared with 71%. Prematurity does not appear to have influenced the haemoglobin level as much as might be expected. According to Kunckel (56), Lichtenstein (57), Lande (58) and others, there is a distinct and very early haemoglobin impoverishment of the blood, which reaches its maximum about the third to the fourth month. According to Mackay the haemoglobin level in premature infants is high at birth, there is an early drop and the minimum level is reached at 3 to 4 months of life.

Case III. Charts 3a. & 3c.

H. M. Mackay's findings.

| Age in Months | Haemoglobin Level (Sahli Method) | Normal Haemoglobin Level | Average Hb. Level |
|---|---|---|---|
| | | Breast Fed. | |
| | % | % | % |
| $10\frac{3}{4}$ | 48 | | |
| | | 86 | 72.8 |
| $11\frac{1}{4}$ | 46 | | |
| $11\frac{1}{2}$ | 46 | | |
| | | 86 | 73.1 |
| $11\frac{3}{4}$ | 50 | | |
| 12 | 53 | | |
| $12\frac{1}{2}$ | 55 | | |
| $12\frac{3}{4}$ | 55 | 86 | 73.9 |
| 13 | 55 | | |
| $13\frac{1}{4}$ | 60 | | |
| $13\frac{1}{2}$ | 62 | | |
| | | 86 | 76.4 |
| $13\frac{3}{4}$ | 68 | | |
| 14 | 68 | | |
| $14\frac{1}{4}$ | 68 | | |
| $14\frac{1}{2}$ | 69 | | |
| $14\frac{3}{4}$ | 70 | | |

By "Normal Haemoglobin Level" is meant the haemoglobin estimation in Breast Fed babies weighing 6 lbs. and upwards at birth and Iron-treated from the 3rd month upwards.

This child has been breast fed till 8-9 months, blood investigations were commenced at the age of 10¾ months and the weight then was 13 lbs.11 ozs. Here a profound degree of anaemia occurred at the outset, this will be referred to later - the haemoglobin level was correspondingly low and together with the septic process a marked change in the haematopoeitic system was found. Whether sepsis produced this profound anaemia or the anaemia was present first and then the septic infection followed, is a difficult issue - but I am inclined to feel that sepsis was a causative factor in the production of the anaemia.

Despite iron treatment the haemoglobin only gradually reached the level of 70%. The average haemoglobin levels here were as follows:-

| | | |
|---|---|---|
| 10-11 mths | 48% | as compared with 86% for breast fed iron treated infants, and 72.8% untreated breast fed infants. |
| 11-12 mths | 48% | as compared with 86% for breast fed iron treated infants, and 73.1% untreated breast fed infants. |
| 12-13 mths | 55% | as compared with 86% for breast fed iron treated infants, and 73.9% untreated breast fed infants. |
| 13-14 mths | 64% | as compared with 86% for breast fed iron treated infants, and 76.4% untreated breast fed infants. |

This case raises the question as to whether iron treatment has any affect in curing the anaemia of septic infection. Mackay points out that: "In infants treated with iron the haemoglobin level was raised from the 3rd month onwards. It is possible with continuous iron to maintain a level of 77% in infancy and upwards from 5 to 12 months". This, of course, refers to healthy infants. "That bacterial infection and disease play a part in producing iron deficiency in the infant has not been generally recognised", says H.M.Mackay (59). "Disease, due to a great variety of causes, from haemorrhage to sepsis may lower the haemoglobin level and so create an extra need for haemoglobin building: this in turn creates an extra call on the iron store in the liver, which is often inadequate for growth alone and leads to anaemia due to iron want complicating the original condition".

According to Parsons( 60) in infections the beneficial effect of iron is greatly diminished or even absent. I am entirely in agreement with the above view for observations on septic children as compared with ordinary nutritional anaemias show poor reponse to iron therapy. That several factors are responsible for increase in the

haemoglobin level must be taken into account, when general health improves and resistance to infection is established, iron may be more efficacious in contributing with some appreciable degree to increased haemoglobin level.

Case Iv. Charts 4a & 4c.

| Age in Weeks. | Haemoglobin Level (Sahli Method) % | Average Haemoglobin Values in the bottle fed. (H.M.Mackay's findings) % |
|---|---|---|
| 7 | 75 | 80 |
| 8 | 74 | |
| 9 | 67 | 69.4 |
| 10 | 67 | |
| 11 | 67 | |
| 12 | 66 | |
| 13 | 67 | 71 |
| nearly 15 | 70 | |

This presents a case of numerous skin abscesses and respiratory complication, the infant was artificially fed, weight at 6 weeks 7 lbs. 12 ozs. and iron treatment commenced at the age of 11 weeks. The average haemoglobin level between 1 and 2 months was 74.5% as compared with 80% of the bottle fed series, 2 to 3 months 66% as compared with 69.4%, 3 to 4 months 68.5% as compared with 70.1%. In this case, too, there appears only a small reduction from the standards given by H.M.Mackay, indeed, haemoglobin level in this infection falls within

limits of normal bottle fed infants. It is interesting to find that the mother's haemoglobin was 30% when the infant was 7 weeks old and that she was already receiving treatment for her profound degree of anaemia. According to the majority of authorities infants born of aneamic mothers derive from them their full complement of haemoglobin and Baar & Stransky (61) state that anaemia of the mother does not produce anaemia in the newborn child.

Case V. Charts 5a & 5c.

| Age in Weeks | Haemoglobin Level (Sahli Method) % | Average Haemoglobin Values in the bottle fed. (H.M.MackaY8s findings). % |
|---|---|---|
| 3-4 | 75 | |
| 5 | 70 | |
| 6 | 74 | 80 |
| 7 | 70 | |
| 8 | 66 | |
| 10 | 66 | 69.4 |
| 11 | 65 | |

This infant weighed 5 lbs. at 3 weeks and was artificially fed. Skin sepsis, discharging eyes and gastrointestinal upset were features of this case. The average haemoglobin between 1 and 2 months was 70% as compared with 80% of bottle fed series of Helen Mackay's group, 2 to 3 months 65.5% as compared with 69.4%. In this case Haemolac was given for a period of a few weeks and a small quantity of mist Ferri. et ammon. cit. given latterly. The haemoglobin does not appear to be much below the level of Mackay's standard for normal bottle fed infants.

Case VI. Charts 6a. & 6c.

| Age in Weeks | Haemoglobin Level (Sahli Method) | Average Haemoglobin Values in the bottle fed. (H.M.Mackay's findings) |
|---|---|---|
| | % | % |
| 6 | 76 | |
| 7 | 74 | 80 |
| 8 | 74 | |
| 9 | 68 | |
| 11 | 66 | 69.4 |
| 12 | 67 | |

This infant weighed 6 lbs. 12 ozs. at 5 weeks and was artificially fed, no iron treatment administered at any period whatsoever.

The infant had failed to gain weight showed few skin lesions and mild gastrointestinal upset. Average haemoglobin level for period of 1 to 2 months was 74% as compared with 80% of H.M.Mackay's figures and between 2 to 3 months 67% as compared with 69.4%. Here too there is very little divergence from the normal standard and the infant was not given any iron treatment at any time.

OLD CASES: RETURN SEPTIC CASES SEEN BY ME AS OUT PATIENTS - 1,2,3 YEARS AFTER HOSPITAL TREATMENT.

In Group I - 2 years.

| | Age | Haemoglobin % |
|---|---|---|
| Case VII. | 1 yr. | 65 |
| " IX. | 1 yr. 3 mths. | 57 |
| " X. | 1 yr. | 58 |
| " XIII. | 1 yr. 4 mths. | 48 |
| " XV. | 2 yrs. | 55 |

In Group 2 - 3 years.

| | | |
|---|---|---|
| Case XI. | 2 yrs. 8 mths. | 60 |
| " XII. | 2 yrs. 3 mths | 60 |
| " XIV. | 3 yrs. | 65 |

In Group 3- 4 years.

| | | |
|---|---|---|
| Case VIII. | nearly 4 yrs. | 67 |

According to Thursfield (Garrod, Batten, Thursfield) haemoglobin at the age period of 1 year lies between 70-75%, and does not rise until the end of the 2nd year.

According to Holt, haemoglobin under 2 years lies between 65-85%. H.M.Mackay states that the haemoglobin reaches a low level at about the 1st year.

Leichtenstein's figures are high compared with others, at 9 months 77%, 2 years 74%, 4-6 years 76%. In my group 1 -2 years the haemoglobin is rather lower than the given standard and if 65% be included in the normal ratio , the others are much reduced. In most of these cases rickets has complicated the picture and the resultant reduction in haemoglobin, I think, attributable to the anaemia of rickets. Then, too, malnutrition in these cases is an important factor and many of these children are the victims of poor circumstances and improper nutrition.

In the age group 2-3 years haemoglobin lies in the neighbourhood of 60-65% in my cases. In the 2nd year the haemoglobin rises and should be in the neighbourhood of 70%, so that here, too, there is only a slight disparity in the findings. The same findings as group 1-2 years applies here too, 3-4 year group my patients had a haemoglobin of 67% which does not really fall far short of the haemoglobin found in town children living under poor conditions.

Conclusions.

Thus the haemoglobin in mild sepsis in infancy shows little appreciable reduction or none at all from the standard laid down by Helen Mackay as normal for infants of that period. In the older group of children the haemoglobin seems variable and much reduced in age group 1-2 years, other factors such as rickets and malnutrition complicating the picture. It seems quite definite that this haemoglobin level lowering has no connection with the previous history of sepsis. Group 2-3 years the haemoglobin is more nearly approaching normal standards. Group 3-4 years almost normal standards has been approached here. Mild sepsis does not appear to exert any influence on the haemoglobin level in infancy or early childhood.

The Number of Red Blood Corpuscles.

All are agreed that at birth the red blood corpuscles number about 5,6, or 7 millions - the 2nd week they number 5 million per cmm. and from then onwards there may be a slight decrease under this figure, which is considered within physiological limits. In the majority of mild anaemias the red blood corpuscles number between 3½-4 million, or slightly above that, and all observations on blood counts prove this to be the case. It is not safe to diagnose an anaemia on the basis of a somewhat low blood count. The appearance of red cells in films will be discussed at the end of this chapter.

The conclusion from repeated blood counts is that the red cell count does not fall appreciably below normal limits, and little is to be learnt from this investigation alone, its use lies in the estimation of the colour index. The variation in reds may to some extent be accounted for by technical errors which are bound to arise even under the most careful technique.

The Colour Index.

It has been said that in infections in infancy the colour index becomes very low. Kugelmass states that sepsis shows a rapidly developing anaemia with a low colour index. In very small infants this fact has not come to light in the cases I have done, the colour index being either .8 or .9, and in a few instances .7. In the older infant Case III Chart 3a. the findings agree with Kugelmass , that is, low colour index. In this case the colour index remained at .6 for avery long period and only when the whole picture improved did this gradually pass on until the colour index of .7 was reached.

Reticulocytes.

This has proved very variable too. In some instances out of 600 cells counted only one or two showed reticulation, in such cases I have recorded only an occasional reticulocyte seen - instead of calculating a diminutive percentage. I have obtained as many as 6-8% reticulocytes, but as a rule 1-2% is the average of the reticulocytes seen. The calculation of reticulocytes gives an idea of the rate of blood formation in disease, reticulocytes occur also when the marrow is irritated by certain substances in contradistinction to a regenerative process.

Holt (62) 1st day 2-5%. 10th day 1%. 3 months .5%.

Jurgens (63). In human infants the percentage of reticulocytes is 7% at birth, 2% at 10 days, and .7% at 6 weeks. In premature infants the number was much greater, 11-30% at birth.

According to Witts (64) a enumeration of the reticulocytes is a valuable method of determining the rate of blood formation.

The White Blood Corpuscles.

Apart from the recent work of Helen Mackay on infant's haemoglobin, there are no absolute and uniform standards to be obtained of the behaviour of the white blood corpuscles in infants.

It is regretable that the whole blood picture in infancy is not of greater value than it is. So little has been known of the normal physiological reactions of the infantile blood system and even though the red cells, haemoglobin and colour index are now fairly elucidated, there still remains considerable ignorance of the white cell response.

The number of white blood corpuscles is indeed very variable, it varies according to time of day, from person to person and different estimations for the normal standard have been presented for nurslings by these observers. Their estimations are as follows:-

(1) Gundobin (65), 9,000 to 15,000;

(2) Benjamin (66), 8,000 to 12,000;

(3) Rominger (67), 9,200 to 23,700;

(4) Hofmann& Welker (68), 6,200 to 21,600

all of which constitute an extreme range of figures.

In general the total white count is higher in infancy than in adult life.

Sabin, Cunningham , Doan & Kindwall (69) in investigating this matter have found wide variations from time to time in the adult. "The total white count at any one time may be approximately twice that taken at another period of the same day". They found that counts in the afternoon were higher and also independant on the taking of food.

Fletcher and Mitchell (70) also observed an afternoon leucocytosis in a small group of infants and children, and also a similar rise in early morning - these changes occurred regardless of the ingestion of food. They state that several factors influence the number of leucocytes as ordinarily counted in the capillary blood. Animals such as dogs, cats and rabbits develop a leucocytosis after food, rich in protein. Protein food seems to be more constantly productive of leucocytosis then carbohydrates or fat. Then too increased muscular activity alters the white count, crying, struggling, etc.,

In consequence of all these findings blood counts should be done at corresponding times on successive days. Infections do call for an increase in the number of leucocytes.

This is seen in cases of respiratory infection, in some cases as a resisting mechanism.

I have on one or two occasions noticed a rise from 7,000 to 12,000 white cells in mild sepsis, when a patch of pneumonia has been detected vide Case IV. Chart 4a.

In Case V. Chart 5b. the white blood count on the 11-7-33 was 40,000 per cmm. It is really necessary to correlate this finding with the complete haemogram and in particular the distribution of the leucocytes before any deduction whatsoever can be made. Indeed, both clinical picture and blood picture ought to be reviewed to link up chain of events. Here we find 30.5% of the neutrophile series, a lymphocytic reaction of 62%, and 6% Eosinophiles. I am inclined to infer from the review of the haemogram plus the clinical data that the infant was putting up a tremendous resistance to the mild infection it already possessed. Schilling considers the presence of Eosinophiles with a hyperleucocytosis , a favourable situation. A week later white blood count was 10,500 and subsequent count remained in this neighbourhood. On the 8-8-33 whites numbered 16,400 and Eosinophiles were only present to the extent of 1.5%; but by this time the infant was showing marked signs of progress and all the active phases of the infection were over.

The Differential Count.

The most valuable information is to be obtained from the differential count, with a distribution of the neutrophile series in relation to the other components of the blood film. Whatever stain is employed is immaterial - I have consistently used Leishman's stain and counted 200 cells by the Schilling method. The Schilling Heomogram means a complete survey of the blood, its haemoglobin content, red blood corpuscles, white blood corpuscles and differential count, and when this is correlated with a clinical picture much help can be obtained.

Before this method was employed to any degree Arneth suggested a differential count of the different kinds of the polymorphonuclear neutrophile cells as of value in estimating the resistance of an individual to infection. Normally the number of different polymorphs according to their nuclei is as follows:-

Feldman (71).

| | | | |
|---|---|---|---|
| Class | I. | One-lobed nucleus (most immature) | 10% |
| " | II. | Two-lobed nucleus (maturer than I but still immature) | 25% |
| " | III. | Three-lobed nucleus (normal maturity) | 45% |
| " | IV. | Four-lobed nucleus (senile stage) | 15% |
| " | V. | Five-lobed nucleus (decrepit & disintegrating) | 5% |

| | I. | II. | III. | IV. | V. |
|---|---|---|---|---|---|
| Orland (72) | 7 | 25 | 40 | 24 | 4 |
| Esser (72) | 8 | 47 | 28 | 15 | 3 |

In this connection Feldman (73) states that: "The mature multinucleated cells which prevail in the blood are derived from large nongranular mononuclear cells, and hence in a state of imminent or actual infection there is an accelerated production of these phagocytic, and therefore protective, cells, with the result that cells in an immature state are thrown into the blood stream - in the same way as immature macrocytes are thrown into the circulation when there is excessive destruction of the red cells".

Feldman too considers that: "Myeloblasts pass through several stages in which they diminish in size and their nuclei instead of being unilobular become more irregular (two-lobed - three-lobed - four-lobed - five-lobed). The three-lobed cell is probably the mature one and the more multilobed ones are those past their prime".

Before proceeding further it is necessary to define what is meant by 'a shift to the left'. A shift to the left (Arneth) means an increase in metamyelocytes and band forms, that is, an emigration of young neutrophilic cells from the marrow, in response to an infection.

Hence, if the metamyelocytes and band forms, that is, the immature forms of polymorphs are increased there is a shift to the left.

Sanford (74) makes similar references to the Arneth Count and refers to Arneth's investigation of a baby under 9 days old, which revealed absence of multinucleated leucocytes and a strong left-hand shift. This corresponded with the work of Esser.

Brienil & Priestly also found a strong left-handed shift made in 150 children in Queensland. According to Sanford at birth the newborn child's blood contains only those polymorph leucocytes that have been found in the bone marrow or blood forming organs of the haemopoeitic system and that the multilobed or more mature cells are not found in the haemopoeitic system , but are the result of the younger single-lobed cells maturing in the blood stream. The polymorph count in the newborn, however, undergoes rapid readjustment as the cells mature. As Arneth's method was so complicated it had to be abandoned.

Schilling (75),Feldman (76), Piney (77), Kugelmass & Lampe (78), Rogatz (79), Weiss (80), Schmal, Schmidt & Serebrijski (81) and a host of others state that in infective processes the differential count, shows a shift to the left and

during phase of recovery this shift is decreased, the lymphocytes are increased as well as the Eosinophiles.

Cooke & Ponder (82) go as far as to say that if the count is dislocated to the left, i.e. if there is a shift to the left, the patient is in an infective state. They admit that there are certain reservations, for in the newborn there are a great many more immature cells and a correspondingly greater shift to the left. They further state that: "if the blood is reviewed first and such a nuclear shift has occurred the clinician will in accordance with these findings look for a focus of infection in the child."

It has been quite definitely shown that in very severe sepsis there is a markedly great shift to the left and a complete absence of Eosinophiles (Piney and Schilling etc.).

From all my observations on the blood picture(in chronic cases)of mild sepsis I have found each individual a law unto itself. Most writers, however, adhere to the rule of a decrease in young forms and an increase in Lymphocytes and Eosinophiles on recovery of the patient. Mild sepsis does not produce the marked blood changes which occur in septicaemias. At times there are wide variations in one's findings and I do subscribe to Schilling's view when he says that the

erythrocytic and leucocytic blood picture of a child is highly labile, often corresponding to irritation in a disproportionate manner. Schilling declares that after years of experience he considers pathologic every case of noticeable change in the blood, for example, hyperleucocytosis or neutrophilia, or marked lymphocytosis or distinct nuclear shifts.

I am now going to discuss fully the Schilling blood count and correlate my findings with standards given by Schilling and some co-workers in haemotology. The Schilling blood count as before stated varies from the usual differential count in the division of the polymorphonuclear neutrophiles into groups according to the degree of their maturity. These groups are as follows:

(1) Myelocyten - myelocytes.
(2) Jugendliche - metamyelocytes.
(3) Stabkernige - band forms.
(4) Segmentkernige - segmental forms.

To recapitulate a few facts, I am again referring to the shift to the left.

A shift to the left (Arneth) means an increase in metamyelocytes and band forms, indicating an irritation of the bone marrow to increased activity from infection. The Schilling count centres around the band forms, since their increase

during infection determines the degree of shift. If the metamyelocytes and band forms, that is, if immature forms of polymorphsare increased there is a shift to the left.

Rogatz (83) asserts that at the height of aninfection "this left shift occurs, with decrease of lymphocytes and of monocytes and disappearance of Eosinophiles from the blood". In the phase of improvement "there is a receding neutrophilia, fewer juvenile (metamyelocyte) forms with more segments, and increased lymphocytes and monocytes. This shift is back to the right, the eosinophiles reappear with a final lymphocytosis indicating recovery".

It is quite obvious that a much better conception is obtained if cells are judged according to their maturity, rather than classifying them as polymorphs and so differentiating from lymphocytes and other cells.

Piney (84) says that nucleated reds and a small percentage of myelocytes can be found even in normal blood. He considers, as several others before mentioned, that absolute eosinopenia is very characteristic of active infection and monocytosis, which is common but not invariable in such circumstances . This absolute eosinopenia

which has received general acceptance in septic conditions does not exist in mild sepsis. I have never discovered a single film without the presence of a few eosinophiles and am inclined to feel that such an assertion in mild sepsis is due to faulty technique, which can be accounted for by deterioration of the stain employed or over-staining the film, in which case the eosinophile granules may be obscured.

The first phase of the infective process Piney describes as one in which there is extreme neutrophilia, with great reduction or even disappearance of eosinophiles or basophiles and a reduction of lymphocytes.

The resulting impression being that the marrow is so busy producing neutrophiles that other cells receive little attention from the parent tissue (the reticulo endothelium) and in consequence lymphocytes are also reduced.

During the phase of recovery in convalescence, there is a very significant change. The neutrophiles gradually fall to normal numbers but the lymphocytes increase both relatively and absolutely to figures well above normal (this is called postinfective lymphocytosis). The eosinophiles and often the monocytes also show an increase during convalescence (postinfective cytosis).

This, however, applies to the adult and no special reference to the infantile blood response in sepsis is dealt with by this author.

Schilling (85) divides his blood groups into three (1) Newborn, (2) Nurslings, (3) Infants 1-6 years. In the newborn there is neutrophilia with marked shift and relative lymphocytosis. Schilling does not give any standard of his own for the normal blood picture in nurslings, but the standard for adults is as follows:-

| | |
|---|---|
| Myelocytes | 0 |
| Metamyelocytes | 0-1 |
| Band forms | 3-5 |
| Segmental forms | 51-67 |
| Lymphocytes | 21-35 |
| Monocytes | 4-8 |
| Eosinophiles | 2 -4 |
| Basophiles | 0-1. |

As stated before the infantile blood system responds rather differently to infections than the adult, and it is, therefore, quite conceivable that the normal standard of infants varies greatly from that of adults.

This fact of the great variation from the standards set down for adults is shown by a number of observers whom Schilling refers to.

They are as follows:-

Carstanjen:

| Months. | Eosin | N | L | Mon. |
|---|---|---|---|---|
| 1-6 | 3.59 | 34.54 | 50.78 | 11.09 |
| 7-12 | 0.76 | 40.84 | 49.21 | 9.19 |

Ziocovicz (average in 80 healthy nurslings)

| Bas. | Eosin. | L. | N. | Mon. | Tuerk's |
|---|---|---|---|---|---|
| 0.2 | 1.9 | 66. | 25 | 6.7 | 0.25 |

Normal Haemogram:

| | Bas. | Eos. | M. | J. | St. | S. | L. | Mon. |
|---|---|---|---|---|---|---|---|---|
| According to Ockel | 0.5-1 | 1-5 | - | 0-5 | 0-1 | 15-40 | 49-75 | 3-12 |
| According to Hofmann & Welker | 0.1 | 0-7 | - | 0-9.5 | 0-2 | 5-49 | 42.5 -90.5 | 0.16 |
| According to Schuessler | - | 2 | - | 2 | - | 29 | 61 | 6 |
| According to Rominger | 0.1 | 2-4 | - | 8 | 0.5 | 16 | 62-69 | 6 |
| | | | (-) | (0.17) | (0- (1.5) | (6.5- (25) | | |

Though there are quite wide variations given by these observers for the normal standard, it is useful to compare this table with the standard in disease and to see how far they differ.

Schilling, Schuessler, and Ockel consider nuclear shifts with more than 5 stabs (band forms)

as pathologic, During my work on the blood films I have been curiously interested in the great number of immature forms of cells, by that I mean metamyelocytes and band forms, which determine the degree of shift. It has been by no means unusual to find the existence of as many as 47 bands and in quite a number of cases they have varied between 20 and 40:- These figures being very much higher than the normal standard given by any observer above mentioned. Even in the blood of normal healthy infants up to the age of 2 years I have been struck by the greater number of band forms as compared with the mature segments. Indeed very few polymorphs show the true segmentation, by which I mean only a mere thread of chromatin uniting the nucleoli. Consequently, I am inclined to feel that the standards set by Ockel, Hofmann and Welker are rather low as far as the band forms are concerned. If 5 stabs (band forms) be considered pathologic - I venture to say that this would bring every nursling into the field of ill health should the judgment rest on this basis.

In most cases the reaction has been of the lymphocytic type which is in accordance with the findings of most observers. Especially must it be remembered that in artificially nourished infants a rapid activity of the lymphocytic apparatus

is developed.

It is often claimed that Monocytes are high. I have found as many as 19% in one case. Schilling declares that: "Monocytoses develop mainly in the crisis of acute infections either temporarily or constantly in the course of less virulent remittent infections, with frequently repeating crises they accompany the immunisation processes". (86). Piney does definitely state that a high monocyte count does occur in infancy and quite readily disappears as the blood assumes a more mature picture.

Before proceeding to demonstrate my haemotological findings I wish briefly to summarise a few of my findings in relation to the blood picture in the infection of infancy. In this field complete investigations have not yet been made. "The opinion that the blood of the child reacts essentially different from that of adults has not been definitely confirmed with regard to the haemogram of infection. It is a fact, however, that fluctuations take place more readily; and for very young children we must also remember the high lymphocytosis of the 1st months and years". (Schilling).

In this respect as a result of the investigations I have made, I feel convinced that the adult picture is in no way to be compared with that of the child. The variations are wide even in the groups of infants of the same age, and comparison from infant to infant may be difficult and hence very much more difficult from the adult standpoint.

I. On one occasion I have found hyperleucocytoses with the presence of eosinophiles to the extent of 6%, and this proved rather a favourable situation. No dogmatic inference can, however, be drawn from one observation of this nature but apparently Schilling regards this in a favourable light.

II. On quite a few occasions I have particularly noticed an increase in the lymphocytes during a phase of gastrointestinal upset; this lymphocytosis was probably a defensive mechanism during the period of bowel infection.

III. Moderate or high blood count has occurred quite frequently with a marked shift, a slight decline in lymphocytes and few eosinophiles even in a phase of recovery, so that this finding cannot be regarded in an unfavourable light. I am inclined to feel that no interpretation is adequate unless correlated with the clinical picture.

IV. At no time has there been a complete absence of eosinophiles.

V. In some instances I have found a decreased shift and a corresponding increase in the lymphocytes and eosinophiles with recovery from the clinical standpoint.

VI. The eosinophiles are increased when the patient is putting up a resistance to infection, and would appear to be quite a favourable phenomomon.

CHART 1b.

Name: Norah A.

DIFFERENTIAL COUNTS. HAEMOGRAM (SCHILLING)

Leishman's Stain.

| Date. | Total White Count | Myelocytes % | Metamyelocytes % | Band forms % | Segmental forms % | Total % |
|---|---|---|---|---|---|---|
| | | Neutrophile Leucocytes. | | | | |
| 23-5-33 | 11,800 | .5 | 12 | 32 | 8.5 | 53 |
| 26-5-33 | | 0 | 4 | 40 | 10 | 54 |
| 29-5-33 | 10,000 | 0 | 7 | 20 | 6 | 33 |
| 5-6-33 | 10,000 | 0 | 14 | 32.5 | 4.5 | 51 |
| 6-6-33 | 10,600 | 0 | 7 | 46 | 5 | 58 |
| 12-6-33 | | 0 | 5.5 | 29.5 | 3.5 | 38.5 |
| 19-6-33 | 8,000 | 0 | 2.5 | 14.5 | 5 | 22 |
| 24-6-33 | | 0 | 2 | 26 | 3 | 31 |
| 26-6-33 | 10,000 | 0 | 7.5 | 30 | 2.5 | 40 |
| 3-7-33 | 10,000 | 0 | 2 | 19 | 3.5 | 24.5 |

| | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles % |
|---|---|---|---|---|
| 23-5-33 | 40 | 6 | 2 | 0 |
| 26-5-33 | 40 | 6 | 2 | 0 |
| 29-5-33 | 60 | 2 | 1.5 | 0 |
| 5-6-33 | 44 | 4 | 2 | 0 |
| 6-6-33 | 42 | 2 | 1 | 0 |
| 12-6-33 | 58 | 0 | 3 | 1 |
| 19-6-33 | 75 | .5 | 2 | 0 |
| 24-6-33 | 68 | 0 | 2 | 0 |
| 26-6-33 | 57.5 | .5 | 2 | 0 |
| 3-7-33 | 67.5 | 3.5 | 4.5 | 0 |

A Correlation of the Haemogram and Clinical Picture in 6 cases.

Case I. Charts 1b. & 1c.

Age on Admission: 4 weeks.

23-5-33: White Blood Count: 11,800.

Immature forms (that is Metamyelocyte & bands forms) 44.5%, lymphocytes 40%. This shows a rather large shift to the left. At this stage the clinical condition was as follows:-

The infant was of good size and weight for its age - 8 lbs. 2 ozs. Had a fair amount of skin sepsis and pyuria. Motions 1-2 per day, slightly relaxed. No temperature.

26-5-33: Young forms 44%. Lymphocytes 40%. Eosinophiles 2% ( same as on 23-5-33). There appeared to be no change in either the clinical condition or blood picture in this short period of three days.

29-5-33: White Blood Count: 10,000.

Immature forms 27% (that is, the shift to the left is less marked), lymphocytes 60%, monocytes 2%, eosinophiles 1.5%. According to the haemogram a phase of recovery is indicated, however, the clinical condition is much the same as before and the weight slightly increased.

5-6-33: W.B.C. 10,000.
Immature forms 46.5% (that is a more marked shift to the left), lymphocytes 44%, eosinophiles 2%.
There is little change in the clinical condition of the 29-5-33, though the weight is going up.
6-6-33: W.B.C. 10,600.
Little change in the one day in the clinical picture.
12-6-33: Immature forms 35%, lymphocytes 58%, eosinophiles 3%. Clinically there is a marked pyuria of a few days duration. Skin sepsis is improving and stools not very abnormal.
19-6-33: W.B.C. 8,000.
Immature forms 17% (that is the shift to the left is considerably less), lymphocytes 75%, eosinophiles 2%. This has followed a slump period with loss of weight, pyuria, and gastrointestinal upset.
Apparently recovery has set in and here the blood picture and clinical picture are in agreement with the findings of the workers on sepsis in relation to the blood picture. It is quite likely that the increase in lymphocytes is due to the bowel irritation present in the infant and is of a defensive nature.

24-6-33: Immature forms 28% (that is, the shift to the left is greater now), lymphocytes 68%, eosinophiles 2%.

26-6-33: W.B.C. 10,000.

Immature forms 37.5%, lymphocytes 57.5%, eosinophiles 2%. This is in an improved phase: the weight is going up, the urine clear, and the gastrointestinal upset over. Despite this there is an increase in the shift and the lymphocytes are decreased.

3-7-33: Immature forms 21% (there is a lesser shift), lymphocytes 67.5%, eosinophiles 4.5%.

On admission this case showed a marked shift to the left, a decrease in lymphocytes, and eosinophiles present to the extent of 2%. In the phase of improvement as shown in 3-7-33 the lymphocytes and eosinophiles were increased and the shift decreased.

CHART 2b.

Name: Emily R.

DIFFERENTIAL COUNTS — Haemogram (Schilling)

Leishman's Stain.

| Date | Total White Count | Myelocytes % | Metamyelocytes % | Band forms % | Segmental forms % | Total % |
|---|---|---|---|---|---|---|
| | | Neutrophile Leucocytes. | | | | |
| 19-5-33 | 9,300 | - | 7 | 10 | 4 | 21 |
| 26-5-33 | 15,000 | - | 9 | 21 | 1 | 31 |
| 7-6-33 | 12,000 | - | 4 | 28 | 3 | 35 |
| 13-6-33 | 8,000 | - | 5 | 28 | 2 | 35 |
| 20-6-33 | 9,000 | - | 3 | 32 | 2 | 37 |
| 27-6-33 | 12,000 | - | 21 | 8 | 2 | 31 |
| 30-6-33 | | - | 18.5 | 12.5 | 1 | 32 |
| 6-7-33 | 8,000 | - | 1,5 | 32 | 0 | 33.5 |
| 12-7-33 | 8,000 | - | 2 | 36 | 2 | 38 |
| 17-7-33 | 8,000 | - | 1 | 35 | 3 | 39 |

| | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles % |
|---|---|---|---|---|
| 19-5-33 | 70 | 9 | 3 | 0 |
| 26-5-33 | 63 | 4 | 3 | 0 |
| 7-6-33 | 60 | 3 | 3.5 | 0 |
| 13-6-33 | 58 | 2 | 5 | 0 |
| 20-6-33 | 60 | 1 | 4 | 0 |
| 27-6-33 | 62 | 4 | 1 | 0 |
| 30-6-33 | 65 | 2.5 | .5 | 0 |
| 6-7-33 | 62.5 | 3 | 1.5 | 0 |
| 12-7-33 | 60 | 1 | 1 | 0 |
| 17-7-33 | 58 | 1 | 1 | 0 |

To face p. 95.

Case II. Charts 2b & 2c.

Blood work commenced when the infant was 8 weeks old.

19-5-33: W.B.C. 9,300.

Immature forms 17%, lymphocytes 70%. eosinophiles 3%. The blood work in this case was commenced a few weeks after admission, when the child was in a phase of recovery. The skin sepsis was clearing up, Pyuria, however, had appeared, the weight was going up and the gastrointestinal tract apparently functioning normally.

26-5-33: W.B.C. 15,000.

Immature forms 30%, (that is an increase in the shift to the left), lymphocytes 63%, eosinophiles 3%. The clinical picture here presented a slump period with discharging ears, return of skin sepsis, marked pyuria, gastrointestinal upset and with this we find an increase in the white count, an increase in the number of immature forms and a slight decrease of lymphocytes, though the eosinophiles have remained constant.

7-6-33: W.B.C. 12,000.

Immature forms 32%, lymphocytes 60%, eosinophiles 3.5%. Despite slight improvement in the clinical condition there is a slight increase in immature forms, a little reduction in the lymphocytes. In accordance with the Schilling haemogram, the

inference deducted from this would be a fresh outburst of sepsis though this has been accompanied by slight improvement in the condition of the infant.

13-6-33: W.B.C. 8,000.
Immature forms 33%, lymphocytes 58%, eosinophiles 5%. Clinical condition has improved, weight is going up and the infant is generally better.

20-6-33: W.B.C. 9,000.
Immature forms 35%, lymphocytes 60%, eosinophiles 4%. Clinical condition much improved, absence of pyuria, stools normal and weight going up. Still we find the shift increased, and the lymphocytes only showing a very slight increase. The eosinophiles have shown no startling change throughout this case, indeed they lie between 3 and 4%.

27-6-33: W.B.C.12,000.
Immature forms 29%, lymphocytes 62%, eosinophiles 1%. The condition is not very favourable here, the weight has gone down a little,and pus has reappeared in the urine. Gastrointestinal upset has begun with vomiting and increase in motions. Despite this there is a decrease in immature forms, and increase in lymphocytes, and a corresponding decrease in

eosinophiles. The clinical picture is one of a definite stage of remission, and yet the blood picture shows signs of improvement, in accordance with "the infective standard" laid down by different writers.

30-6-33: Immature forms 31%, (that is an increase in the shift to the left) lymphocytes 65%, eosinophiles.5%. The clinical condition is very slightly improved.

6-7-33: W.B.C. 8,000.
Immature forms 33.5%, lymphocytes 62.5%, eosinophiles 1.5%. This is in a distinct clinical phase of improvement.

12-7-33: W.B.C. 8,000.
Immature forms 38% (that is, an increase in the shift to the left) lymphocytes 60%, esoinophiles 1%, Clinical condition much improved.

17-7-33: W.B.C. 8,000.
Immmature forms 36%, lymphocytes 58%, eosinophiles 1%. Clinical condition very good indeed.

Weight increased, no evidence of sepsis, taking feeds well. Child discharged.

This case definitely deviates from the rule laid down about the response of blood to septic infection. One cannot be dogmatic about the blood picture findings in mild sepsis as the rule of adults is not adhered to in all infants. Here in a phase of improvement there is an increase in the immature forms (that is, the shift to the left is great) the lymphocytes are decreased and the eosinophiles are decreased too;- Though at no time in the blood examination has there been an absence of eosinophiles. This is not a finding in mild sepsis. Premature children are supposed to have a high leucocyte count with neutrophilia at first. This then recedes with marked nuclear shift (Frank, Prag, Ockel etc.). Several observers have declared that in the 4th week the lymphocytesranged between 75 and 82% in premature infants, but they do not state the behaviour of the lymphocytes at the age of 2 months. At no time has there been a lymphocytosis of over 70%.

Name: Frank H.

| Date | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles % |
|---|---|---|---|---|
| 26-4-33 | 54 | 14.5 | 2 | .5 |
| 1-5-33 | 45 | 14 | 2 | 1 |
| 5-5-33 | 53.5 | 15.5 | 9.5 | 0 |
| 8-5-33 | 37.5 | 19 | 6.5 | 0 |
| 15-5-33 | 41.5 | 13 | 11 | 0 |
| 2-6-33 | 32 | 4 | 2 | 0 |
| 7-6-33 | 55 | 3.5 | 2.5 | 0 |
| 14-6-33 | 47 | 2 | 3 | .5 |
| 22-6-33 | 68.5 | 1 | .5 | 0 |
| 29-6-33 | 55.5 | 1.5 | 1 | .5 |
| 7-7-33 | 46 | 2.5 | 3.5 | 0 |
| 13-7-33 | 54.0 | 5 | 7 | 0 |
| 21-7-33 | 55.5 | 3 | 1 | 0 |
| 27-7-33 | 53 | 3.5 | 2.5 | 0 |
| 31-7-33 | 75 | 1.5 | 1 | 0 |

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CHART 3b.

Name: Frank H.

DIFFERENTIAL COUNTS. Haemogram (Schilling)

Leishman's Stain.

| Date. | Total White Count. | Myelocytes % | Metamyelocytes % | Band forms % | Segmental forms. % | Total % |
|---|---|---|---|---|---|---|
| | | | Neutrophile Leucocytes. | | | |
| 26-4-33 | 8,740 | - | 2.5 | 17 | 9 | 28.5 |
| 1-5-33 | 12,300 | - | 5 | 23 | 7 | 35.0 |
| 5-5-33 | | 2.5 | 5 | 14.5 | 1.5 | 23.5 |
| 8-5-33 | 11,250 | - | 2.5 | 29 | 5 | 36.5 |
| 15-5-33 | 12,500 | - | 1.5 | 26 | 4.5 | 32.0 |
| 2-6-33 | 12,000 | - | 10.5 | 47 | 4.5 | 62.0 |
| 7-6-33 | 12,000 | - | 2 | 38 | 3 | 43.0 |
| 14-6-33 | 10,000 | - | 7 | 39 | 3 | 49.0 |
| 22-6-33 | 8,000 | - | 4.5 | 24.5 | 1.5 | 30.5 |
| 29-6-33 | 9,100 | - | 3.5 | 34 | 4 | 41.5 |
| 7-7-33 | 11,000 | - | 1 | 45 | 2 | 48.0 |
| 13-7-33 | 10,300 | - | 1.5 | 30.5 | 1.5 | 33.5 |
| 21-7-33 | 9,700 | - | 6 | 29 | 5.5 | 40.5 |
| 27-7-33 | 7,000 | - | 1.0 | 36.5 | 4 | 41.5 |
| 31-7-33 | 7,800 | | 2. | 19 | 3 | 24.0 |

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Case III. Charts 3b. & 3c.

Older infant with various skin manifestations, blood examination commenced on the 26-4-33 when infant was about 11 months old.

26-4-33: W.B.C. 8,740.

Immature forms 19.5%, lymphocytes 54%, eosinophiles 2%, and here the monocytes are present to the degree of 14.5%. Child was in a stage of improvement here - previous to this he had been acutely ill.

1-5-33: W.B.C. 12,300.

Immature forms 28%, (that is, there is an increase in the shift to the left), lymphocytes 45%, monocytes 14%, eosinophiles 2%. The clinical picture was a definite stage of improvement with increase in weight, good appetite, clear urine, and normal stools.

5-5-33: Immature forms 22%, (that is, there is a decrease in the shift), lymphocytes 53.5%, eosinophiles 9.5%, monocytes 15.5%. Patient is resisting the infection fairly well. In a few instances I have observed an increase in eosinophiles when the patient is putting up a great fight to overcome the process of infection.

8-5-33: W.B.C. 11,250.

Immature forms 31.5%, lymphocytes 37.5%, monocytes 19%, eosinophiles 6.5%. Despite these findings, which do not appear to those of Kugelmass, Schilling, Piney and a number of other observers, the clinical picture is one of definite improvement with an increase in weight and a very good appetite. It is interesting, too, to note that the large percentage in monocytes is recorded as 19%. Piney (87) says that the monocytes are very numerous in infantile blood (about 15%) but fall to adult numbers comparatively early.

15-5-33: W.B.C. 12,500.

Immature forms 27.5%, lymphocytes 41.5%, monocytes 13%, eosinophiles 11%. The clinical picture appears to be quite favourable here too. This is at a stage where there is a decrease in immature forms, an increase of lymphocytes to a small degree and of eosinophiles.

2-6-33: W.B.C. 12,000.

Immature forms 57.5%, (there is an extreme degree of shift to the left), lymphocytes 32%, monocytes 4%, eosinophiles 2%. The clinical picture presents decreased weight, cough and the condition of the child is rather poor. The blood findings here do correspond with those of severe septic infections.

7-6-33: W.B.C. 12,000.
Immature forms 40%, lymphocytes 55%, monocytes 3.5%, eosinophiles 2.5%. Weight is being maintained and there is a very slight degree of improvement.
Chest symptoms are pronounced and the picture looks like an interstitial pneumonia.
14-6-33: W.B.C. 10,000.
Immature forms 46% (the shift to the left is still large), lymphocytes 47½, monocytes 2%, eosinophiles 3%. There is very little change in the clinical condition.
22-6-33: W.B.C. 8,000.
Immature forms 29%, lymphocytes 68.5%, monocytes 1%, eosinophiles .5%. There is a definite phase of improvement here. The monocytes and eosinophiles are decreasing as is also the number of immature forms and the lymphocytes are increased.
29-6-33: W.B.C. 9,100.
Immature forms 37.5%, lymphocytes 55.5%, eosinophiles 1%, monocytes 1.5%. The ears have commenced to discharge, but other clinical features present quite a favourable prognosis. There is an increase in the immature forms, probably as a response to the infection, which has arisen.

7-7-33: W.B.C. 11,000.
Immature forms 46%, lymphocytes 46%, monocytes 2.5%, eosinophiles 3.5%. This is in a phase of improvement yet the shift to the left is large.
13-7-33: W.B.C. 10,300.
Immature forms 32%, lymphocytes 54%, Monocytes 5%, eosinophiles 7%. Child is definitely improving. Here there is a decrease in the number of immature forms, and the lymphocytes and eosinophiles are increased.
21-7-33: W%B.C. 9,700.
Immature forms 35%, lymphocytes 55.5%, monocytes 3%, eosinophiles 1%. Clinical condition still favourable. In a phase of improvement.
27-7-33: W.B.C. 7,000.
Immature forms 37.5%, lymphocytes 53%, monocytes 3.5%, eosinophiles 2.5%. Much improved, despite the large number of immature forms.
31-7-33: Immature forms 21%, (that is there is a lesser degree of shift to the left), lymphocytes 75%, monocytes 1.5%, eosinophiles 1%. The child is considerably improved. Has gained weight well. The blood picture shows an increase haemoglobin to 70%, a decrease in the number of immature forms, and increase in the lymphocytes but the eosinophiles have decreased, only 1% being present. The

monocytes have decreased considerably. In correlating the clinical and blood picture one is apt to find a great variation from time to time. There does not in consequence appear to be any distinct rule and each case has to be judged on its own merits. This case, too, points to a monocytoses at one period - Piney thinks this quite a normal finding. Schilling considers it a temporary occurrence in infection or an accompaniment of the process of immunisation. In adults an increase in monocytes occurs during convalescence, but the blood of adults,as before stated,reacts entirely differently to that of the child.

CHART 4b.

Name: Ronald K.

DIFFERENTIAL COUNTS. Haemogram (Schilling)

Leishman's Stain.

| Date | Total White Count | Myelocytes % | Metamyelocytes. % | Band forms % | Segmental forms % | Total % |
|---|---|---|---|---|---|---|
| | | | Neutrophile Leucocytes. | | | |
| 2-7-33 | 10,900 | - | 13 | 20 | 0 | 33 |
| 10-7-33 | 11,080 | - | 4.5 | 30 | 2 | 36.5 |
| 18-7-33 | 7,000 | - | 2 | 29 | .5 | 31.5 |
| 24-7-33 | 7,000 | - | 1 | 36 | 4.5 | 41.5 |
| 1-8-33 | 7,000 | - | 9 | 16 | 1 | 26 |
| 7-8-33 | 12,000 | - | 1 | 44 | 3 | 48 |
| 21-8-33 | 9,300 | - | 5 | 17 | 5 | 27 |

| | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles. % |
|---|---|---|---|---|
| 2-7-33 | 65 | 2 | 1.5 | - |
| 10-7-33 | 57 | 2.5 | 3 | - |
| 18-7-33 | 62 | 5 | 1 | - |
| 24-7-33 | 52 | 2 | 4 | - |
| 1-8-33 | 67 | 5 | 1 | - |
| 7-8-33 | 50 | 1 | 3 | - |
| 21-8-33 | 62 | 3 | 7 | - |

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Case Iv. Charts 4b. & 4c.

Infant age 6 weeks, numerous skin abscesses followed by respiratory complications later on.

2-7-33: W.B.C. 10,900.

Immature forms 33%, lymphocytes 65%, eosinophiles 1.5%, The infant is in a highly infective state, losing weight, marked gastrointestinal disturbance and skin sepsis.

10-7-33: W.B.C. 11,080.

Immature forms 34.5%, lymphocytes 57%, eosinophiles 3%. There is only very slight improvement in the clinical condition, the number of immature forms is slightly increased, the lymphocytes have decreased but improvement is present to a very slight degree.

18-7-33: W.B.C. 7,000.

Immature forms 31%, lymphocytes 62%, eosinophiles 1%. Improvement is more marked now, skin lesions are clearing up , blood shows a decrease in immature forms and an increase in lymphocytes.

24-7-33: W.B.C. 7,000.

Immature forms 37%, lymphocytes 52%, eosinophiles 4%, Weight much the same as before, gastrointestinal disturbance abating, and general condition little improved.

1-8-33: W.B.C. 7,000.

Immature forms 25%, lymphocytes 67%, eosinophiles 1%. Definite signs of improvement in the clinical condition.

7-8-33: W.B.C. 12,000.

Immature forms 45%, lymphocytes 50%, eosinophiles 3%. The immature forms are in great evidence (that is there is a large shift to the left), however, the clinical picture has distinctly improved despite this change.

21-8-33: W.B.C. 9,300.

Immature forms 22%, lymphocytes 62%, eosinophiles 7%. The immature forms are much less in evidence (that is the shift is smaller). The lymphocytes and eosinophiles are correspondingly increased, the monocytes have not been referred to as they show little change. The general condition is very good indeed and this case does apparently adhere to the general rule of an improved blood picture of the types of cases described by haemotologists for septic invasion.

CHART 5b.

Name: Jean O.

DIFFERENTIAL COUNTS. Haemogram (Schilling)

Leishman's Stain.

| Date | Total White Count | Myelocytes % | Metamyelocytes % | Band forms % | Segmental forms. % | Total. % |
|---|---|---|---|---|---|---|
| | | | Neutrophile Leucocytes. | | | |
| 11-7-33 | 40,000 | - | 4 | 26 | .5 | 30.5 |
| 19-7-33 | 10,500 | - | 4 | 16 | 8 | 28 |
| 25-7-33 | 10,800 | - | 5 | 33 | 0 | 38 |
| 3-8-33 | 9,100 | - | 3 | 23 | 2 | 28 |
| 8-8-33 | 16,400 | - | 5 | 19.5 | .5 | 25 |
| 22-8-33 | 13,000 | - | 4 | 20 | 1 | 25 |
| 29-8-33 | 17,100 | - | 3 | 31 | 6 | 40 |

| | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles % |
|---|---|---|---|---|
| 11-7-33 | 62 | 2 | 6 | - |
| 19-7-33 | 65 | 2 | 5 | - |
| 25-7-33 | 50 | 2 | 9 | - |
| 3-8-33 | 66 | 1 | 7 | - |
| 8-8-33 | 69 | 2 | 1.5 | - |
| 22-8-33 | 67 | 3 | 5 | - |
| 29-8-33 | 58 | 2 | 1 | - |

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Case V. Charts 5b & 5c.

Small infant, unable to suck, pyuria, skin sepsis, weight 5 lbs. Age 3 weeks.

11-7-33: W.B.C. 40,000.

Immature forms 30%m lymphocytes 62%, eosinophiles 6%. Clinical condition poor. As before mentioned, infant is putting up a tremendous resistance to infection and Schilling considers a hyperleucocytosis with increased eosinophiles a favourable sign. This apparently proved itself here.

19-7-33: W.B.C. 10,500.

Immature forms 20%, lymphocytes 65%, eosinophiles 5%. The clinical condition shows improvement. Weight has remained stationary in the past few days, but the infant is now making attempts to suck after 11 days catheter feeding.

25-7-33: W.B.C. 10,800.

Immature forms 38%, (that is, there is a large shift to the left), lymphocytes 50%, eosinophiles 9%. Clinical condition shows a slight change. The weight is stationary, skin infection less, there is absence of pyuria, and the gastrointestinal conditon has improved. The immature forms have increased in numbers, the lymphocytes have decreased and the eosinophiles have increased.

3-8-33: W.B.C. 9,100.

Immature forms 26%, lymphocytes 66%, eosinophiles 7%. According to Schilling's interpretation of the heamogram the infant should be at a stage of recovery, perhaps this agrees to some extent with the clinical data. The weight is being maintained at 6 lbs, and the skin sepsis is very slight now.

8-8-33: W.B.C. 16,400.

Immature forms 24.5%, lymphocytes 69%, eosinophiles 1·5%, The clinical picture shows a distinct improvement, only a slight degree of rhinitis being present.

22-8-33: W.B.C. 13,000.

Immature forms 24%, lymphocytes 67%, eosinophiles 5%. Clinical picture good, recovery is undoubtedly occurring.

28-8-33: W.B.C. 17,100.

Immature forms 34%, (that is, the shift to the left is large), lymphocytes 58%, eosinophiles 1%. Clinical condition very good indeed. Throughout this haemogram the eosinophiles have been evident to a fair extent - this constant presence of eosinophiles and hyperleucocytosis means a favourable situation. In the final phase with a good gain in weight, clear urine, and definite recovery, there is an increased shift to the left, lymphocytes are decreased, and eoisonphiles decreased.

CHART 6b.

Name: George G.

DIFFERENTIAL COUNTS. Haemogram (Schilling)

Leishman's Stain.

| Date. | Total White Count | Myelocytes % | Metamyelocytes % | Band Forms % | Segmental forms. % | Total % |
|---|---|---|---|---|---|---|
| | | Neutrophile Leucocytes. | | | | |
| 22-7-33 | 8,000 | - | 2 | 21 | 5 | 28 |
| 28-7-33 | 9,000 | - | 7 | 31 | 4 | 42 |
| 4-8-33 | 9,400 | - | 8 | 16 | 5 | 29 |
| 9-8-33 | 9,400 | - | 4.5 | 27.5 | 7 | 39 |
| 23-8-33 | 9,000 | - | 4 | 25 | 8 | 37 |
| 30-8-33 | 9,500 | - | 5 | 10.5 | 4 | 19.5 |

| | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles % |
|---|---|---|---|---|
| 22-7-33 | 66 | 5 | 2 | 0 |
| 28-7-33 | 51 | 5 | 2 | 0 |
| 4-8-33 | 67 | 1 | 3 | 0 |
| 9-8-33 | 56 | 3 | 2 | 0 |
| 23-8-33 | 60 | 1 | 2 | 0 |
| 30-8-33 | 74 | 3.5 | 3 | 0 |

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Case VI. Charts 6b. & 6c.

Age 6 weeks at commencement of blood work.

Case of failure to gain weight. Skin sepsis, and gastrointestinal disturbance to a slight extent. Weight: 7 lbs. 3 ozs.

22-7-33: W.B.C. 8,000.

Immature forms 23%, lymphocytes 66%, eosinophiles 2%.

Clinical picture shows a distinct improvement since admission to hospital. Increase in weight, motions much improved.

28-7-33: W.B.C. 9,000.

Immature forms 38%, (that is, an increased left shift), lymphocytes 51%, eosinophiles 2%.

Clinical condition, little change. Gastrointestinal upset.

4-8-33: W.B.C. 9, 400.

Immature forms 24%, (that is, there is a lesser degree of shift), lymphocytes 67%, eosinophiles 3%.

Both haemogram and clinical picture are in accordance with Schilling and other haemotologists' interpretations of sepsis at this point.

The infant is greatly improved.

9-8-33: W.B.C. 9,400.

Immature forms 32%, lymphocytes 56%, eosinophiles 2%.

Condition still improving.

23-8-33: W.B.C. 9,000.

Immature forms 29%, lymphocytes 60%, eosinophiles 2%. Marked improvement clinically, corresponding decrease in immature forms, increase in lymphocytes, eosinophiles unchanged.

30-8-33: W.B.C. 9,500.

Immature forms 15.5% (that is, there is much lesser degree of shift to the left), lymphocytes 74%, eosinophiles 3%. Clinical picture gain in weight to 9 lbs, infant is making very good progress. Here the shift is decreased, lymphocytes and eosinohpiles increased so that the response inthe blood picture has been similar to that of acute infections in adults, although of itself only a mild case of sepsis.

Conclusions concerning the haemograms in mild sepsis in the 6 cases under discussion.

In this connection I may state there is no definite rule whatsoever.

Case I. On discharge showed a decrease in the immature forms ( alesser degree of shift), an increase in lymphocytes, and in eosinophiles.

Case II. A large number of immature forms,36%, decrease in lymphocytes and in eosinophiles, 1% of the latter being present, which is a distinct decrease during the course of the blood investigations. This infant continues to do well, seen as an Out Patient on a few occasions and has had no setbacks up to the present.

Case III. Older infant. On discharge the immature forms were decreased (there was a lesser degree of shift to the left), the lymphocytes were increased, but the eosinophiles were reduced. The clinical condition, however, was excellent.

Case IV. On discharge there was a decrease in the number of immature forms (there was a lesser degree of shift to the left) lymphocytes and eosinophiles were increased and the infant in an excellent condition.

Case V. The number of immature forms was increased (that is, there was a greater shift to the left), the lymphocytes and eosinophiles were decreased despite an excellent clinical condition on discharge of the patient.

Case VI. The final blood picture showed a decrease in immature forms (that is, a lesser degree of shift to the left), an increase of lymphocytes and eosinophiles, and the infant in a very good condition.

My six cases have been accompanied by two results, 3 have shown typical response to the descriptions of sepsis referred to in textbooks, and 3 atypical results. This leads me to conclude that there is no definite standard to be set in mild sepsis in infancy. There is little in the way of normal standards for comparison, and results that may be classed as normal for adults with infection are certainly not standards to be applied to infants. In consequence it seems quite legitimate to refute the current views on the response of the blood to sepsis in acute infections as applied to infants.

The Schilling Blood Count in the Prognosis of Acute infections in Infancy.

Rogatz(88)considers the Schilling blood count of greater value than the ordinary differential smears in supplementing and interpreting the clinical picture of acute pathologic conditions in infancy. This assertion seems quite fair, but I do not agree with his remarks when he states that the haemogram can be considered as "a more sensitive indicator of what is happening in the body than either the fever or physical signs". Interpretations of the blood, as shown in mild sepsis on this basis would lead to much confusion and an erroneous prognosis from time to time. It is equally true that "the absorption of toxins from the blood stream during an infection stumlates the bone marrow to the formation of cellular elements, which are thrown into the peripheral blood and do not appear there in health. It seems, furthermore, that this process goes on somewhat in advance of other changes in the body, so that the reaction to illness or improvement is first evident in the blood". (88). This last statement is, I think, as yet unproven - Schmidt & Serebrijski (89) in discussing pus infections and sepsis state that a low cell count occurs and, therefore, the blood count is not a perfect basis for deciding whether to

operate or not. A strong shifting is not constant. They further state "that changes in the qualitative blood picture within the neutrophilic cells do not depend on the number of the cells".

One must not be tempted into utilising any one laboratory finding as an absolute diagnosis. By far the most important thing in any given case is the clinical picture and blood examination a useful adjunct . In purely haemotological conditions, blood pictures are absolutely essential, e.g. Pernicious anaemia, leukaemias, etc. but in purely medical and surgical issues blood examination alone cannot be employed to determine the case. Schilling quotes a case where a skilled surgeon asked for an interpretation of the child's blood picture. Appendicitis was suspected and operation was considered. "haemogram phase of severe regenerative struggle - opinion given severe infection; according to prediagnosis threatening appendicitis, operation indicated. Course..The surgical report the following day, a second examination indicated a diagnosis of pneumonia..Therefore, the blood picture was misleading. In this case the haemogram was misleading because of the influence of the prediagnosis."

However, one must concede that the utility is much more pronouced and more constant in severe sepsis - as mild sepsis has been shown as presenting

A variable blood picture. Results at repeated intervals show great variance and interpretations based on blood would indicate an unfavourable prognosis in cases not so inclined. The results of the blood picture in mild sepsis are consequently inconclusive.

The Red Blood Cells on Film Examination.

In examining the blood film one must not neglect to look at the red blood corpuscles carefully. In a great number of films prepared the reds have been poorly filled, that is, they have shown hypochromia, some are irregularly shaped and sized - but this is infrequent - and very few presented nucleated reds and in no instance did I find megaloblasts. Thus the resultant microcytic hypochromic anaemia to use the nomenclature of Witts, has been evident to a very mild degree from all my findings of the blood examination in six instances - the only pronounced anaemia being that of Case III the older infant.

As all these cases of sepsis are chronic it seems feasible that like other tissues the haemopoeitic system is likely to suffer as well.

How do these infections produce anaemia?

This may be due to three factors:-

(1) Either increased blood destruction.

(2) Or absence of blood formation,

(3) Or a combination of the two factors.

(1) Increased blood destruction, - rather refers to the haemolytic type of anaemia, that is, one in which there is a marked increase in reticulocytes, which is not really dealt with here. Absence of blood formation in a severe form really means an aplastic anaemia, here the reticulocyte count aids considerably, in every instance the red cells have shown evidence of reticulation - which means that there was an attempted regeneration as a response to septic infection. In this connection one must remember, too, that reticulocytes can present themselves in an aplastic anaemia. I refer to Witts (90) here when he says "I have seen the reticulocyte count of 6% in an aplastic anaemia - though the absolute number was small and this is not surprising when we remember that a few remnants of hyperplastic marrow are usually left in the disease". However, as before stated, no single part of the blood picture can be taken as conclusive - results must rest on a comprehensive survey of all the blood findings taken together. I am inclined

to think that infections tend to act by suppressing the myeloid function and in mild sepsis this may be so minute as to produce no apparent results in the blood.

Is the severity of the infection directly related to the resulting degree of anaemia? Yes. In chronic infections the result is proportionately slow - the rate of regeneration of the haemoglobin and red blood cells may be depressed to a very slight extent. To give Kugelmass's words on this subject "The hypochromia is due to excessive blood demands, which makes last stage haemoglobin saturation incomplete".

Does infection injure the blood forming tissues or their products in the circulating blood? In anaemia associated with mild sepsis, the anaemia results from injury to the erythropoeitic tissue of the marrow rather than to cells in the circulating blood. It is a"manifestation of marrow insufficiency".

Hypochromia as before stated may be regarded as due to the fact that haemoglobin saturation of the young cells is the last stage of erythropoiesis. If the red blood cells are rapidly thrown into the circulation polychromatophilia results - this is known as reticulation of the reds in supravitally stained slides. According to Whipple the

"stroma of the red cell is synthesised by the liver from its available store of amino acids. Therefore, it is only in liver injury, occurring for example in the course of sepsis - that the erythrocyte content of the blood is markedly diminished." This, however, occurs in more virulent forms of sepsis - mild forms only manifest mild depression of regeneration of haemoglobin and erythrocytes.

What relation has anaemia associated with infection to the rate of recovery? This can best be answered in a few words - improvement in the general condition produces an improved blood picture. The anaemia bears a direct relation to the clinical picture and its progress.

Mild sepsis produces then amild degree of microcytic hypochromic anaemia - the colour index is little disturbed, except in the older infant which shows a low colour index and the reticulocytes usually lies between 1 and 2%.

Diagnosis and Differential Diagnosis.

Absolute diagnosis is based on the history of birth and delivery and behaviour of the infant in the first few weeks of life. Difficulty in feeding, failure to gain weight, skin sepsis, otorrhoea, gastrointestinal disturbance, intermittent pyuria, present a typical picture. In some cases respiratory complications may be in evidence instead of gastrointestinal disturbance or along with it.

Differential Diagnosis, must be made from true dyspepsia and marasmus. This may be intensely difficult. If after a few days in hospital an infant with a marasmic appearance rapidly gains weight, it seems likely to be due to errors of feeding, for example under-feeding, and the extra food supply in consequence produces rapid gain in weight. In a marasmic infant of septic nature the progress is slow and there are many remissions and recurrent septic manifestations. To declare a case, one of sepsis, a focus of infection must be established quite definitely - it cannot be left to conjecture. However, it is in the border-line cases the immense difficulty occurs and when a considered marasmic baby passes into a bronchopneumonia or gastroenteritis - the factor of infection is all too evident.

Prognosis depends on the degree of affection. In mild sepsis it is on the whole favourable and varies from 2 to 4 months to produce a cure. It is wise to be guarded in the prognosis at the commencement, for a very mild localised lesion may be the precursor of a more generalised and persistent infection which may considerably lower the resistance of the infant. A steady and maintained weight is a very good prognostic sign and this too, despite return of pyuria or discharging ears, shows that resistance to infection has been established and the infant is on the road to recovery.

When the Respiratory tract is at fault from the commencement, the prognosis is not favourable, as rapid extension with fatal bronchopneumonia may readily occur. Extensive skin lesions with septic umbilicus, may soon pass to a generalised severe infection and here, too, the prognosis must be guarded. On the whole, staphylococcal infections are amenable to treatment and spell quite a favourable prognosis.

Treatment of Mild Sepsis.

(1) Prophylactic Treatment.

Perhaps no other medical condition requires as rigid prophylaxis as infantile sepsis - it is the keynote of success in the treatment of this problem. Prophylaxis of the mother and child are two important issues.

An excellent opportunity of co-operation is afforded to our Government, our Municipalities, Eugenists, our Social Workers and all our complex mechanisms which constitute society. Their aim should be better housing conditions, fresh air, ventilation, and a cheerful environment, all of which make their contribution to healthy ideas and existence. Our industrial cities, so congested especially in our poorer districts, provide very unfavourable dwellings. In a great number of instances the kitchen subserves several functions - it is the living room, the kitchen, and the bedroom combined, and in damp weather entirely devoid of any ventilation. Consequently, the air breathed is foul - the clothes may be hung up to dry and in turn add their quota of dampness to the atmosphere as well. Thus there is little wonder that infective organisms adorn these premises and readily find a host to receive them and continue their activities.

Perhaps the prophylactic treatment can best be presented in tabular form.

I. Ordinary antenatal precautions and the avoidance of too much handling before the birth of the child.

2. Special care must be exercised, especially when the mother has had a puerperal infection.

3. Prevention of spread of infection during the mother's confinement.

4. Proper care to prevent infection after birth.

5. Care of the skin and the umbilicus. Rigid asepsis should be carried out in cord dressings.

6. Frequent changing of baby's napkins: also avoidance of meddlesome cleaning of the mouth. Great care should be taken to prevent contamination of the hands by the excreta and nurses should be instructed to carefully cleanse their hands after attention to the child. It is wise too to have a bowl of antiseptic lotion in the ward for the use of doctors in attendance as well.

7. It is important, too, to have healthy nurses - they should be free from respiratory or skin infection. A sore throat or cold can so readily be transmitted to an infant that it is essential first to have healthy and fit attendants, to ensure a certain degree of safety at any rate.

8. All septic cases should be treated on lines of bed isolation and each infant should have its own utensils. Teats should be carefully sterilised as well as feeding bottles. (a) "one nurse" method may minimise the transmission danger from child to child - economic conditions may not allow of such a liberal nursing staff - but it seems a good practical solution for institutional problems.

9. The question of institutional overcrowding should always be foremost in our minds and should be avoided. A mixture of infections in a small ward with several cots does not predict a favourable omen. On the other hand, the elaborate glass cubicles devised by some and constructed in various hospitals, does not appear to solve the problem . A natural environment and adequate ventilation seems preferable to a glass conservatory for the production of artificial and forced products.

(2) General Treatment.

Good feeding is of prime import. If the mother has a supply of breast milk its use should be continued. If the infant is too feeble to suck at the breast, milk should be drawn off and given by spoon or by bottle. Where the supply of breast milk in the mother is exhausted - breast milk of another nursing mother may be used. In the event of breast milk not being available cow's milk mixtures can be employed with success in hospital. In some instances the infant is too feeble to suck, in these cases catheter feeding can be resorted to, as it reserves the expenditure of energy, which the act of sucking entails. I have used this method very successfully in two of my cases (Casee II and Case V).

Half strength (5%) Glucose in saline can be given in between feeds, to supply the extra fluid intake when necessary. In cases with marked gastrointestinal upset (Case IV) I have used lactic acid with good results.

Medicinal Treatment seems of little avail. Treatment resolves itself into symptomatic treatment. If the conjunctivae are effected and discharge is present, cleansing with boric lotion and insertion of a few drops, night and morning, of Argyrol 5% or Protargol 10% is all that is necessary to cure the condition locally.

If the mouth is the seat of stomatitis, glycerine and borax washes should be used, or a potassium chlorate mouth solution.

Ear discharge should be treated by cleansing the tympanum with Hydrogen peroxide - glycerine in carbolic (5%) drops may be instilled as well. Active treatment in the form of paracentesis, antrotomy or mastoid operations though extensively carried out in America and in some parts of the Continent, are not practised to any degree in this country in connection with sepsis unless in exceptional cases. My cases have been accompanied by quite good results under purely medical measures, and when the general condition has improved the otologic condition appears to have subsided as well. Indeed, I incline, to the conservative method of treatment as far as the ear is concerned.

Respiratory conditions can only be treated by nursing. No medicines are of avail here.

Gastrointestinal disturbance is corrected by careful dietary measures.

Pyelitis - pyuria, etc., can be improved by the administration of Potassium Citrate grains 5 to grains 10, 2 - 4 hourly. In many instances administration of this drug to infants for a period of 7 to 10 days appears to produce vomiting. This observation

has lead me to use the drug only sparingly for a few days at a time.

Skin sepsis. Minute septic spots respond to a small dab of Tincture Iod. Mitis - larger ones with purulent heads require a prick with a sharp needle and evacuation. In cases of abscesses, incision and drainage is essential and one must avoid spread of pus from one part to another.

Rarely is the infant so dehydrated as to require subcutaneous salines in the mild types of cases - should anything suggest dehydration subcutaneous salines may be given.

For mild anaemia Ferri et Ammonium citrate should be given. In infants from 1 to 2 months the dose used is from 2 grains t.i.d. to 3 grains t.i.d.

Two to 3 months 3 grains t.i.d. - 4 or 5 grains t.i.d.

In the older infants up to 30 grains in the day may be given.

The only thing to be observed is the change in colour of the stools to a grey or dark blackish tinge. The increase in iron should be made gradually, as too rapid an increase in dose may be accompanied by diarrhoea. No ill effects have arisen from the above mentioned doses I have used.

Mild cases do not require blood transfusion, camphor in oil, or bacteriophage therapy, so extensively employed with success in America. In one case demonstrated by me Richard T. (Case VII) injection of mother's serum into the gluteal region proved very efficacious in the treatment of the infant's general condition. According to Speranski (91) the injection of blood from the mother into the gluteus muscle of 50 infants with sepsis, resulted in recovery in 36 cases.

Success lies in good attention and nursing - drugs are only of subsidiary value in the treatment of mild sepsis in infancy.

## S U M M A R Y.

(1). A series of 15 cases of mild sepsis in infancy has been reviewed both from the clinical and haemotological standpoint.

(1) 6 cases have been daily observed and fully investigated over a period of 4 to 5 months and the other 9 cases have been seen as Out Patients by me.

(2) It must be acknowledged that the disease is responsible for a great deal of ill health in infancy, it is frequently overlooked or classed as malnutrition. In other cases the diagnosis of dyspepsia or marasmus is attached to these cases because of their similarity to infantile sepsis. In severe forms accompanied by death there is no discoverable cause - unless the clinician has been open to a diagnosis of sepsis. Mild sepsis is a definite entity and in itself not fatal, though severe forms contribute to the high mortality in infants.

(3) The disease is acquired very early in life. Infection may occur during the (1) the prenatal stage, (2) stage of delivery, unclean hands or instruments may be responsible for a transmission of sepsis to the infant. (3) the stage after birth up to the

3rd to 5th. week when the infant is very susceptible to infection, through trauma to the skin, through contact with disease of any sort.

Peuerperal sepsis may be the factor in the production of ill health in the infant. In some cases the discovery of the source of infection may be extremely difficult.

In my 15 cases, some gave a history of a difficult labour, abnormal puerperium or a septic infection soon after the birth of the infant.

7 cases showed an absolutely normal labour and uneventful puerperium - hence the source of infection is unknown in this group. 3 cases gave a history of puerperal sepsis.

3 cases were delivered instrumentally.

In 1 case the mother developed breast abscesses and white leg 14 days after the birth of the child.

In 1 case an acute attack of asthma in the mother occurred 2 days after birth of the infant - the labour too appeared very difficult.

In 1 of the cases in normal labour and normal puerperium the infant was an inmate of a maternity hospital in which penphigus was prevalent, and was apparently detained in that institution for 5 weeks.

This shows that in over 50% of cases there was evidence of contamination at birth or soon after and that the starting point of infection must have been at this period.

(4) The course of the disease may be acute - subacute - or chronic, and the symptomatology very varied.

The clinical picture I have described is sepsis of a chronic type. The age incidence is between birth to the first year of life, but may be continued beyond that period. In the majority of the 15 cases the homes were poor and the father's unemployed with only a small weekly income.

The incidence of disease appeared more frequent in bottle fed babies than in those on the breast.

In the 15 cases - 14 were artificially fed and only one totally breast fed till the age of 8 or 9 months. In the artificially fed group some were given the breast for 14 days to 5 to 6 weeks this table demonstrates the mode of feeding.

Table I.

| | Breast Fed. | Bottle Fed. |
|---|---|---|
| Case I. | - | Yes. |
| II. | 7 days | Yes. |
| III. | 8-9 months | - |
| IV. | 5 weeks | Yes. |
| V. | 14 days | Yes. |
| VI. | 3 weeks | Yes. |
| VII. | 14 days | Yes. |
| VIII. | 14 days | Yes. |
| IX. | 14 days | Yes. |
| X. | 14 days | Yes. |
| XI. | 4 weeks | Yes. |
| XII. | )-- | Yes. |
| XIII. | -- | Yes. |
| XIV. | 6 weeks | Yes. |
| XV. | 2 months | Yes. |

(5) The clinical manifestations varied widely according to the system affected most, the different groups are as follows:-

1. Cutaneous lesions. Skin sepsis, abscesses boils, septic spots.
2. Respiratory conditions.
3. Gastrointestinal conditions.
4. Renal involvement.
5. Aural lesions.

In all cases the resemblance to dyspepsia and marasmus was marked. In the respiratory group rhinitis and nasopharyngeal involvement or cleft palate deformities may initiate the illness and an extension occur down to the lungs. Gastrointestinal conditions vary from a very mild degree of upset to troublesome vomiting and diarrhoea - but never of the severe nature of true gastroenteritis. Renal involvement;in a great number of cases pyuria occurred and this was particularly of an intermittent nature. Daily microscopic examination of the urine is to be recommended, it is of invaluable assistance and serves to demonstrate the intermittent nature of the pyuria. Aural involvement occurs in the form of discharging ears and appears to subside under suitable treatment and with improvement in the general condition.

Skin lesions varying from septic spots to abscesses occurred in 14 cases of the 15 represented. The explanation of this is obvious as the skin of infants is easily traumatised at birth and in cleansing. Respiratory complications occurred in 4 of the 15 cases.

Gastrointestinal symptoms from mild upset to marked disorder was present in 13 of the 15 cases.

Pyuria occurred in 10 of the 15 cases.

Discharging ears 4 of the 15 cases.

Discharging eyes 3 of the 15 cases.

Table II.

| | Skin Lesions | Ali-mentary Sympts. | Respir-atory Complic. | Pyuria | Discharging Ears | Disch-eyes. |
|---|---|---|---|---|---|---|
| Case I | + | + | − | + | − | − |
| II | + | + + | − | + | + | + |
| III | + | + | + | − | + | + |
| IV | + | + + | + | + | − | − |
| V | + | + | − | + | − | + |
| VI | + | + | − | + | − | − |
| VII | + | + | − | − | + | − |
| VIII | + | + | + | + | − | − |
| IX | + | + | − | + | + | − |
| X | + | − | − | + | − | − |
| XI | + | − | + | − | − | − |
| xII | + | + | − | + | − | − |
| XIII | + | + | − | − | − | − |
| XIV | + | + | − | − | − | − |
| XV | + | + | − | + | − | − |

Most important in the clinical picture are the"remissions" or slump periods of the disease

(6) Bacteriology. It has been proved that the infection is either monomicrobic or polymicrobic, by the fact that 2 or 3 separate invading organisms may be at work together in the same infant. (See Table II with the various systems affected).

In my 6 cases pus from abscesses, boils etc., was of the staphylococcal type - staphylococcus aureus being the offending organism. Cultures from urine have given B.coli as the organism present.

Faecal examinations have rendered the finding of Morgan No.1. bacillus;(in Case V) a late lactose fermenting organism of a nonpathogenic nature was found and one 1 occasion B.proteus was found.

(7) Primary Focus of Sepsis.

A very careful search for this must be made. Findings shows that the skin, gastrointestinal tract and renal tract have in my 15 cases been involved more frequently than other parts,and that the skin was involved in a great many cases at the commencement. Great importance must be attached to the condition of oral mucous membrane, the nasopharynx, skin especially at the umbilicus - because extension fromany of these parts may involve the whole body. Extension to the lungs is always unfavourable.

In some the primary focus of infection cannot be found and these cases consequently referred to as cases with a "cryptogenic focus". The condition though localised at first, readily spreads and becomes generalised.

(8) Pathology: None in mild sepsis, all that is learnt is from severe forms of the disease.

(9) Immunity to the disease may be established early and hence no clinical phenomona may result. In general it would appear that infants in the second half of the first year are more resistant and may readily overthrow infection than at the age of 1 to 6 months.

(10) Haemotology.

This has entailed 50 complete blood counts with the addition of a few extra differential counts bringing the total number to 55 differential counts.

An additional 9 haemoglobin estimations have been done in the Out Patient group. In the 6 cases fully studied and observed over a course of months, the haemoglobin in 5 fell within normal limits, by that I mean, within the standards given by H.M.Mackay in her work on this subject. In the older infant, 9 months old, haemoglobin was much reduced.

In 9 Out Patients, 5 showed haemoglobin level of 60% or over, and 4 cases showed low haemoglobin between 55-48%, and in this latter group rickets and malnutrition appeared to be an accompanying factor.

In all cases the red blood corpuscles varied in numbers between 3½ and 4½ millions.

There was no serious reduction in their numbers.

The colour index was between .8 - .9, with only 1 exception in the case of the older infant where it was between .6 - .7 .

The reticulocytes were normally between 1 & 2%.

White blood corpuscles varied from 8,000 to 15,000 or 16,000, and in 1 case 40,000 whites were present at the commencement of blood investigations.

No actual standard of white blood corpuscles can be cited, they are not usually raised above 15,000 per cmm.

Differential count showed in all cases a preponderance of immature forms and very few segmental forms of mature polymorphs in the neutrophile series.

In no case was there a complete absence of eosinophiles - no case showed a monocytosis, expect Case III, older infant, where 19% of monocytes were

present - this falling within the normal limit in infant's blood. In most cases there was a lymphocytic reaction - 1 or 2 instances, the reaction reverted to the polymorph type.

In three of the 6 fully investigated cases the final stages of recovery showed a blood picture with a decrease in the shift to the left, and increase in lymphocytes and eosinophiles. In the other 3 cases, the shift varied and in some was increased, the lymphocytes decreased and the eosinophiles, though still present, reduced in numbers. Together with this the infants were in an excellent clinical condition and seen afterwards still maintained their progress.

The red cells showed in all cases a mild hypochromic microcytic anaemia, in some instances the red cells were almost empty due to the fact of haemoglobin saturation being the last phase of erythropoeisis.

Thus the blood picture contrary to the findings of sepsis in older children and adults does not present a characteristic picture, and each case has to be judged on its own merits.

(11) Differential Diagnosis, must be made from dyspepsia and marasmus, to which mild sepsis bears a striking resemblance.

(12) The Prognosis varies from 2 to 4 months.

Steady and maintained weight is the best indication of progress, despite a reappearance of pus in the urine or a return of mild gastrointestinal disorder. Prognosis must be guarded in respiratory complications.

(13) Treatment. Prophylactic treatment is of even greater importance than actual treatment.

Avoidance of institutional overcrowding is to be advised. Strict aseptic precautions in the handling of the mother at labour and infants after birth is essential. Drop contagion in infants and hand infection in nurses is to be avoided. All this has been fully discussed under the heading of 'Treatment'.

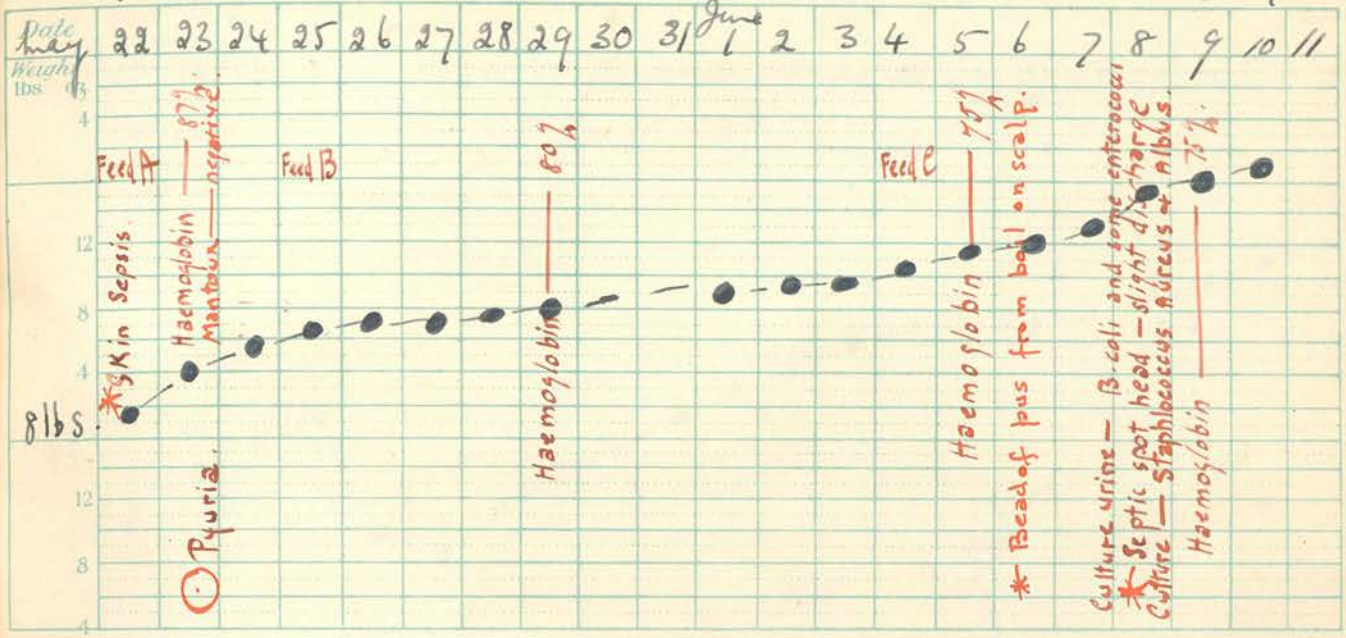
In actual treatment an adequate supply of food is most essential - milk should not be cut down on account of gastrointestinal upset. Generous feeding and good nursing are the medicinal measures required once the disease is present.

Conclusions. Mild sepsis is to be looked upon as a definite clinical entity, preventable by careful attention and guidance at delivery and birth. The disease may have far-reaching results and may present a widely variable clinical picture. The haemotological picture, like the clinical picture, is variable, and no definite standard can be laid down for this examination. Once the disease is established good nursing and a dietetic regime may help to overcome the infection and initiate recovery.

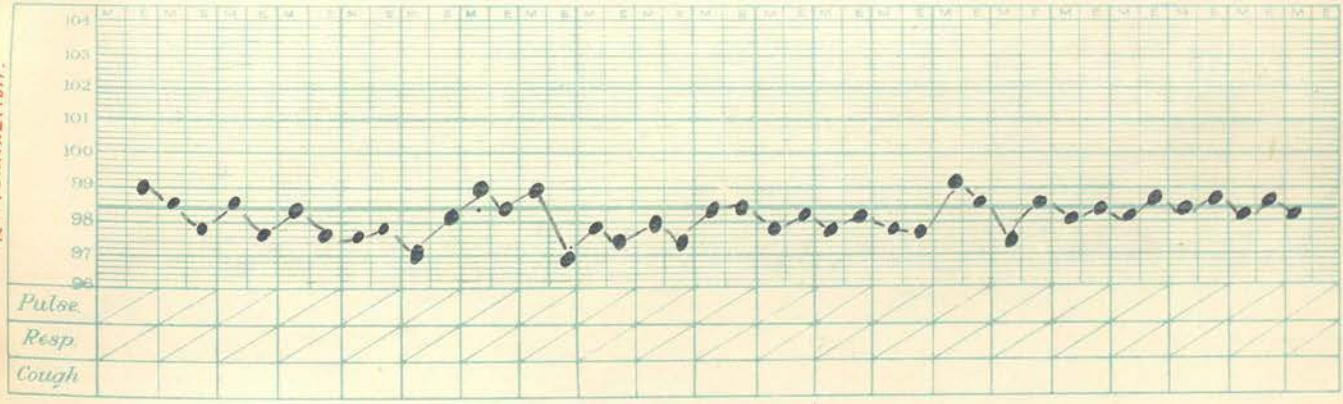
Chart 1c. Page 1.

THE BABIES' HOSPITAL NEWCASTLE

Name Norah A. Date of Admission 22·5·33 Age 4 weeks.




| | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| URINE Pus | | ++ | | | ++ | ++ | | | | | | | mil | | | ++ | ++ | + | + | + | + |
| Alb | | — | | | — | — | | | | | | | faint trace | | | + | + | +½ | ½ | ½ | + |
| Sugar | | — | | | — | — | | | | | | | | | | — | — | — | — | — | — |
| STOOLS N. | 1 | 1 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | |
| ABN. | | | | | | | | | | | | | | | | | | | | | |
| VOMIT | R | R | R | R | R | | | | | | | | | | | | | | | | |
| GASTRIC LAVAGE | | | | | | | | | | | | | | | | | | | | | |
| APPETITE | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |




R = rumination.

NOTES ON FEEDING 22·5·33 Feed A: 28 ozs (2 parts milk + 1 water) 7½% sugar.

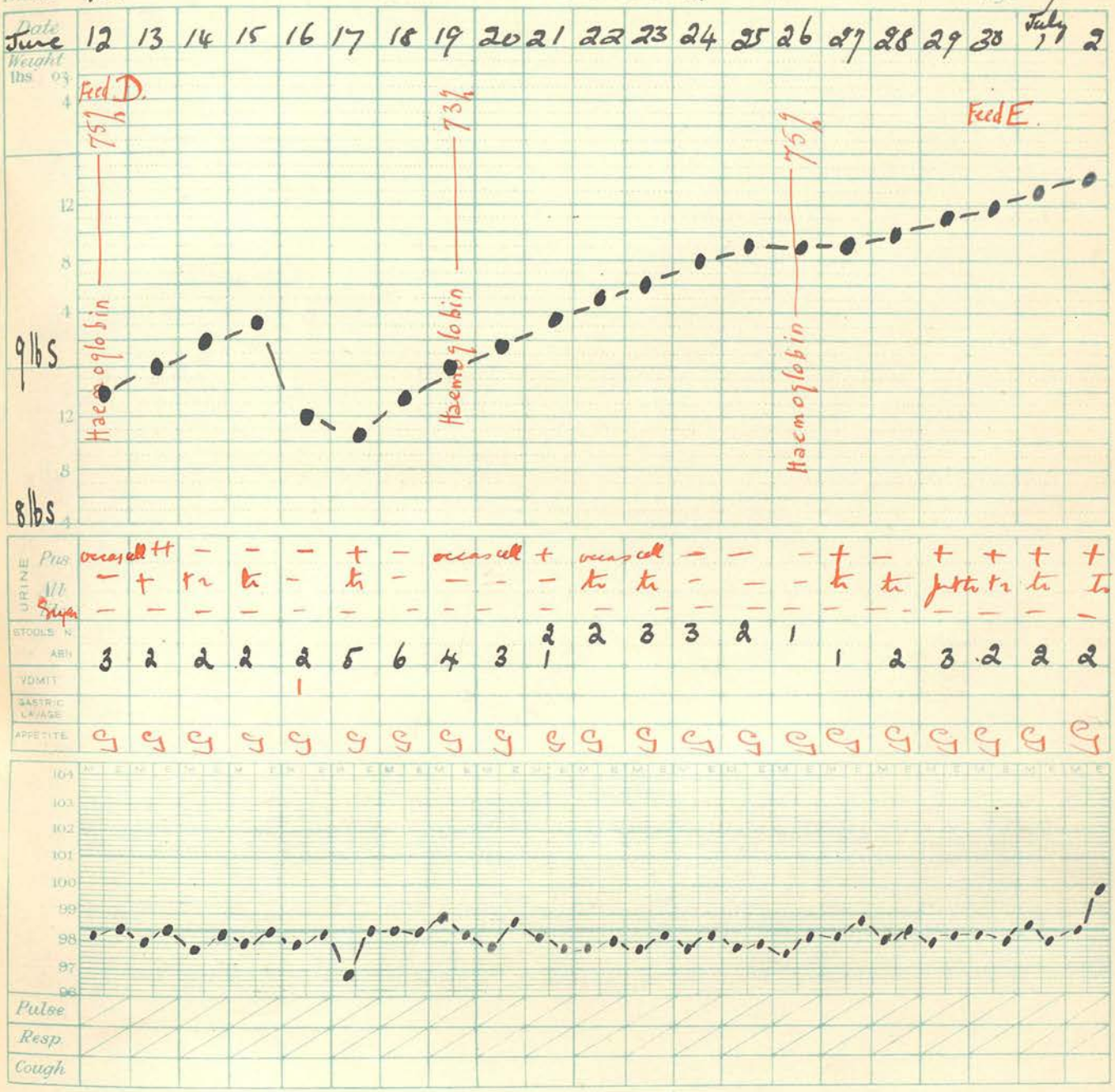
25·5·33 Feed B. 24½ ozs of same mixture as A.

4·5·33. Feed C 24½ ozs (4 parts milk and 2 parts water)

TREATMENT

# THE BABIES' HOSPITAL NEWCASTLE

Name Norah A. Date of Admission 22·5·33 Age 7 weeks




NOTES ON FEEDING

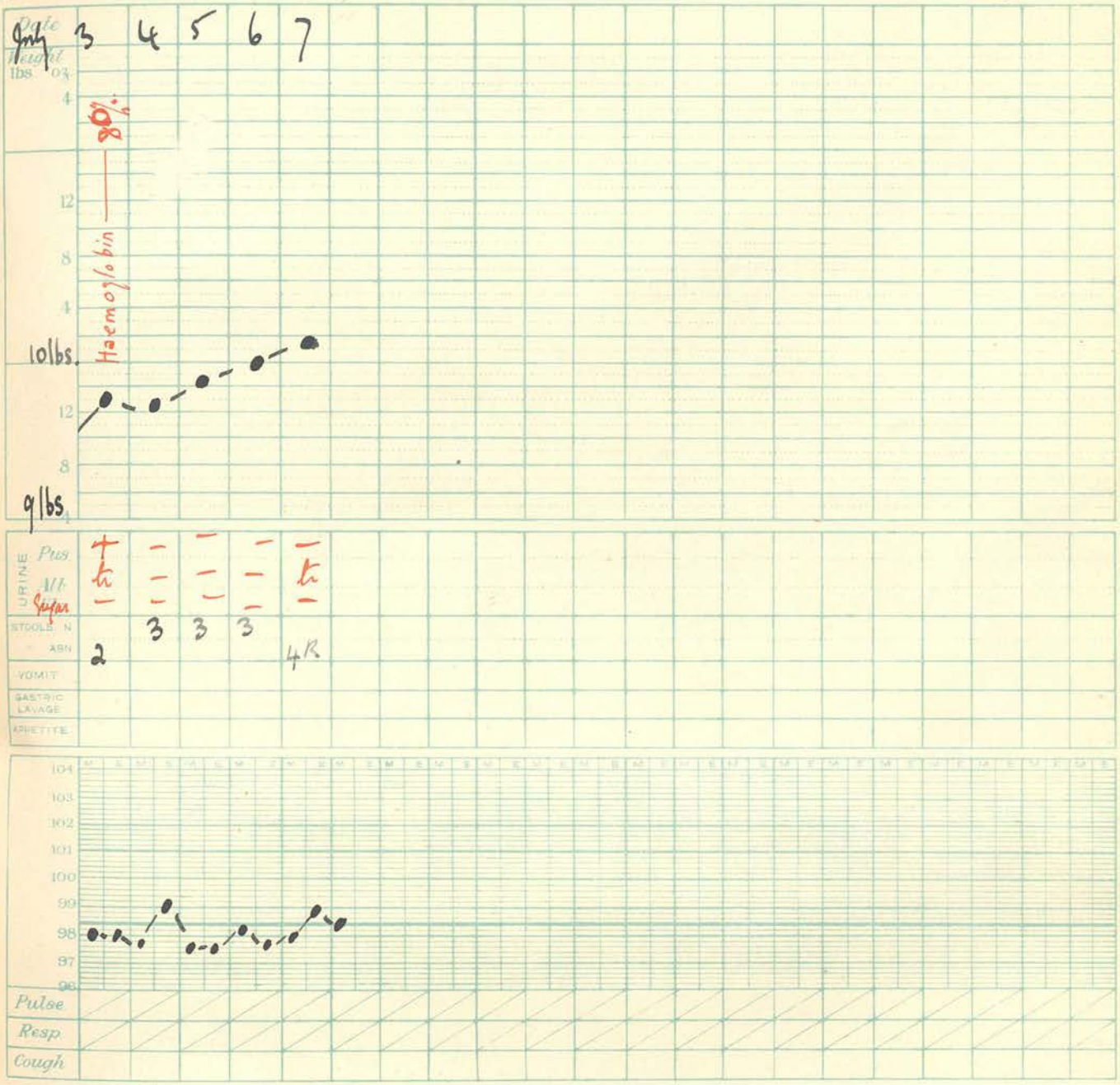
12·6·33 Feed D. 28 ozs
6 feeds. 7½% sugar.

30·6·33 Feed E. 36 ozs. & Sister Laura's food
6 feeds.

TREATMENT

THE BABIES HOSPITAL NEWCASTLE

Name Norah A. Date of Admission 22·5·33 Age 10 weeks.




NOTES ON FEEDING

Feed. E. 7½ q 4h sugar. 36 ozs (milk + water) ē
Sister Laura's food. 6 feeds.

TREATMENT

# C A S E I.

Name: Norah A.

Age on Admission: 1 month.

Admitted: 22-5-33.

Reason for Admission:

I. Septic spot on right thumb.

II. Abscess over left thigh.

III. Discoloration of skin of left side.

Family History:

Mother alive: aged 34 years: has gastric trouble - presumably ulcer.

Father alive: aged 36 years and well: unemployed.

Married 14 years.

6 children: aged 14 years
12 "
8 "
7 "
4 "
1 month.

Other 5 well. No miscarriages.

No family history of Tuberculosis.

Present History:

Baby first seen as an Out Patient when 3 weeks old on 15-5-33.

6th Baby: full time child: normal labour - short duration lasting about 5 hours and a good deal of haemorrhage afterwards. Puerperium - 11 days.

No rise of temperature: perfectly normal puerperium.

Baby cried soon after birth: not weighed when born.

Mother a good witness and states that baby looked quite healthy and was fairly plump.

There was no cyanosis at birth and the skin was quite clear - no spots were noticed anywhere.

Not fed on breast at all - water and sugar 1st day - then put on to Ambrosia.

No history of vomiting after feeds.

Motions 2-3 per day: yellow in colour.

5th day: Nothing observed until 5th day, when a small lump about the size of a shilling piece appeared on left hip region over situation of head of femur - this was red: inflammed and raised above surface.

At the same time left side appeared red and bruised from axilla down to hip - there were no actual septic spots - but skin was indurated and swollen.

6th day: A septic spot noticed on right side of scalp over frontal region - this too became raised and burst after 2-3 days - discharging yellow material stained with blood.

8th-9th day: Septic spot on right thumb.

9th day: Hip abscess burst and discharged a good deal of pus and blood stained material.

9th-21st day: Left side very red and hard to the touch - hip abscess still discharging.

21st day: Seen as an Out Patient with following manifestations:-

I. Septic spot on inner surface of right thumb.

II. Discharging left hip abscess (left flank).

III. Discoloration of skin and induration of left side from axilla to hip - but no septic spots in this portion.

IV. Dry septic lesions of scalp.

Infant well nourished: complexion good.

Weight: 8 lbs. 9 ozs.

21st-28th day: During this week infant had slight epistaxis on one occasion - about a teaspoonful in quantity - thin watery blood.

1 month old: Admitted to hospital.

Examination: 22-5-33.

A well nourished, fair sized infant for its age. Colour good.

Weight on admission: 8 lbs. 2 ozs.

Sclerae clear.

Conjunctivae: no icteric tint.

No anæmia of mucous membranes.

Mouth - tongue: moist and clean.

Tonsils - small, pale: no exudate.

There are no enlarged cervical glands.

No aural discharge and no nasal discharge.

Circumference of head 14¼".

Anterior fontanelle admits tips of 2 fingers and is flush with surface.

Length of child - heel to occiput 19".

Skin - moist: face - clear.

Left side flank - small indurated area size of shilling piece over left hip region: with small sinus and exudation of pus. Skin purplish in colour in that side. Suggestive areas of pin point vesicles on that part. 1 large boil which has burst - over right region of frontal bone and very little discharge from it.

Small polypus at Umbilicus: but no discharge.

Fingers have few scaly marks, remains of one or two septic spots . Thumb on right side - septic spot.

Buttocks - not excoriated or red.

Chest: Heart: apex beat 4th interspace.

No mumurs: Sounds in all areas closed and pure.

Resting heart beat 148 per minute.

Lungs: Resonant throughout.

Good air entry: breath sounds harsh in a few parts: no adventitious sounds.

Abdomen: No distension.

No splenic or hepatic enlargement.

Umbilicus - small polypus: no discharge.

Motions: yellow - relaxed: 1 in 24 hours.

Baby takes feeds well: amount 4 ozs. 3 hourly:

7 feeds ( 2 parts milk: one water: 7½% sugar).

Central Nervous System: Knee jerks equal on both sides and brisk.

Abdominal reflexes equal on both sides.

There is no evidence of glandular enlargement in any part of the body.

Urine: (23-5-33). Acid in reaction:
Microscopically pus cells in fair amount:
No albumin: no sugar.

23-5-33.

Haemoglobin 87%

Red Blood Corpuscles: 4,750,000 per cmm.

Colour Index .9

White Blood Corpuscles: 11,800 per cmm.

Reticulocytes 1%

Differential Count:

| | | |
|---|---|---|
| Myeloblasts | .5% | Total 53% |
| Metamyelocytes | 12% | |
| Band forms | 32% | |
| Segmental forms | 8.5% | |
| Lymphocytes | 40% | |
| Monocytes | 6% | |
| Eosinophiles | 2% | |
| Basophiles | 0% | |

The red blood cells are mostly well filled - a few show hypochromia. No nucleated reds or megaloblasts seen.

In the polymorph series - several of the polymorphs are of primitive type and show 2-3 lobes to nuclei.

Urine: microscopically pus in fair amount.

Mantoux: reaction negative.

25-5-33:

Feed appears too large and baby is ruminating. decreased to 3½ ozs: 7 feeds: 3 hourly.

26-5-33: Urine microscopically pus in fair amount.

Differential Blood Count:

| | | |
|---|---|---|
| Myeloblasts | 0% | |
| Metamyelocytes | 4% | Total 54% |
| Band forms | 40% | |
| Segmental forms | 10% | |
| Lymphocytes | 40% | |
| Monocytes | 6% | |
| Eosinophiles | 2% | |
| Basophiles | 0% | |
| Reticulocytes | 1% | |

Taking feeds well. Stools relaxed : yellow: 3 in 24 hours.

27-5-33:

Urine microscopically cells numerous:

No albumin: no sugar.

Rumination has ceased, under decreased feeds.

Stools 2 in past 24 hours - relaxed - tinge of mucus in them.

29-5-33:
Weight: 8 lbs. 8 ozs. gaining in weight. No further rumination. Baby quite happy and smiling.

Examination of Blood:

Haemoglobin 80%

Red Blood Corpuscles: 4,500,000 per cmm.

Colour Index .8

White Blood Corpuscles: 10,000 per cmm.

Reticulocytes .8%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 7% | Total 33% |
| Band forms | 20% | |
| Segmental forms | 6% | |
| Lymphocytes | 60% | |
| Monocytes | 2% | |
| Eosinophiles | 1.5% | |
| Basophiles | 0% | |

Red blood corpuscles show hypochromia in parts.

30-5-33 - 3-6-33.
Weight steady: 8 lbs. 10 ozs. No fresh septic spots: Urine on 3-6-33: no pus cells: faint trace of albumin: no sugar.

4-6-33: Feed strengthened : 4 parts milk - 2 parts water.

5-6-33: Examination of Blood:

Haemoglobin 75%

Red Blood Corpuscles: 4,000,000 per cmm.

Colour Index .9

White Blood Corpuscles: 10,000 per cmm.

Reticulocytes .6%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 14% ) | |
| Band forms | 32.5% ) | Total 51.0% |
| Segmental forms | 4.5% ) | |
| Lymphocytes | 44% | |
| Monocytes | 4% | |
| Eosinophiles | 2% | |
| Basophiles | 0% | |

Red cells show hypochromia. Few of the cells show poikilocytosis and anisocytosis.

No fresh septic pots. Slight rise of temperature 99°.

Baby has been put on balcony and is improving in general condition.

6-6-33:

Urine microscopically pus in small amount: trace of albumin.

Slight bead of pus from old boil of scalp.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 7% | Total 58% |
| Band forms | 46% | |
| Segmental forms | 5% | |
| Lymphocytes | 42% | |
| Monocytes | 2% | |
| Eosinophiles | 1% | |

7-6-33:
Urine microscopically pus in fair amount:
Albumin present: no Sugar.

3 stools - yellow - relaxed.

8-6-33:
Urine microscopically pus in small amount:
Trace of Albumin: no Sugar.

Bacteriological Report of Urine: The urine was turbid . Reaction acid. Deposit showed many gram negative bacilli - enterococci and a few Gram positive bacilli. There were no acid-fast bacilli. (No.T.B.) Numerous puscells and a few epithelial cells were present. On culture there was a growth of B.coli and some enterococci.

Bacteriological report of pus from boil on scalp of the 6-6-33: A few Gram positive cocci were present in the films made from the swab. There were no acid-fast bacilli. (No T.B.). On culture there was a growth of Staphylococcus aureus and Staphylococcus albus. No other organisms were isolated.

9-6-33; Urine microscopically pus present:
10-6-33: Trace of Albumin:
11-6-33. No sugar.

Stools 2-3 per day: yellow - relaxed.

12-6-33:

Examination of Blood:

Haemoglobin 75%

Red Blood Corpuscles: 4,000,000 per cmm.

Colour Index .9

White Blood Corpuscles: 10,600 per cmm.

Reticulocytes 2.5%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 5.5% | Total 38.5% |
| Band forms | 29.5% | |
| Segmental forms | 3.5% | |
| Lymphocytes | 58% | |
| Monocytes | 0% | |
| Eosinophiles | 3% | |
| Basophiles | 1% | |

Red cells showed more marked hypochromia in this slide than previously. Feed increased to 28 ozs.

Weight: 8 lbs. 14 ozs. Urine occasional pus cell.

13-6-33:
Return of pus.

14-6-33:
Weight increasing. Urine clear.

16-6-33:
One large vomit: practically the whole of one feed.

17-6-33:

Urine - return of pus:

Trace of Albumin.

Stools - 5 in number. Green - relaxed.

Large motions with mucus. Drop in weight to 8 lbs. 10 ozs.

18-6-33:

6 stools - green - relaxed with mucus.

19-6-33:

Examination of Blood:

Haemoglobin 73%

Red Blood Corpuscles: 4.250,000 per cmm.

Colour Index .8

White Blood Corpuscles: 8,000 per cmm.

Reticulocytes 2.5%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 2.5% | ) |
| Band forms | 14.5% | ) Total 22.0% |
| Segmental forms | 5% | ) |
| Lymphocytes | 75% | |
| Monocytes | .5% | |
| Eosinophiles | 2% | |
| Basophiles | 0% | |

One nucleated red cell seen in film field.

Hypochromia of red cells marked.

4 stools - relaxed - offensive - yellow in colour.

21-6-33:

Return of pus - no albumin.

21-6-33 to 26-6-33:

Stools improving: normal in consistence and colour. Result of stools sent on 20-6-33.

Bacteriological report: No enteric or dysentery bacilli found. No other orgamisms of any significance.

24-6-33:

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 2% | Total 31% |
| Band forms | 26% | |
| Segmental forms | 3% | |
| Lymphocytes | 68% | |
| Monocytes | 0% | |
| Eosinophiles | 2% | |
| Basophiles | 0% | |

26-6-33:

Examination of Blood:

Haemoglobin 75%

Red Blood Corpuscles: 4,200,000 per cmm.

Colour Index .9

White Blood Corpuscles: 10,000 per cmm.

Reticulocytes 3%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 7.5% | Total 40.0% |
| Band forms | 30 % | |
| Segmental forms | 2.5% | |
| Lymphocytes | 57.5% | |
| Monocytes | .5% | |
| Eosinophiles | 2% | |

The red cells show a degree of hypochromia.

27-6-33:
Weight - 9 lbs. 9 ozs.

Urine: pus present and trace of Albumin.

Stools - 1 - relaxed - yellow.

28-6-33:
Urine - trace of Albumin.

29-6-33:
Urine - pus present.

3 yellow, relaxed stools.

30-6-33:
Urine -pus present.
2 yellow, relaxed stools.

Weight steadily going up - at present 9 lbs. 12 ozs.

Feeds increased to 36 ozs. with addition of Sister Laura's feed.

1-7-33:
Weight - 9 lbs. 13 ozs.

Urine - pus present. Trace of Albumin.

2 yellow, relaxed stools.

2-7-33:

Slight rise in temperature to 100°.

Urine - pus present and trace of Albumin.

Weight - 9 lbs. 14 ozs.

3-7-33:

Examination of Blood:

Haemoglobin 80%

Red Blood Corpuscles: 4,200,000 per cmm.

Colour Index .9

White Blood Corpuscles: 10,000 per cmm.

Reticulocytes 1.5%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 2% | |
| Band forms | 19% | Total 24.5% |
| Segmental forms | 3.5% | |
| Lymphocytes | 67.5% | |
| Monocytes | 3.5% | |
| Eosinophiles | 4.5% | |
| Basophiles | .5% | |

Red cells show slight hypochromia.

4-7-33:

Temperature 99°.

Urine clear.

3 normal stools.

5-7-33:

Urine clear.

3 normal stools.

6- 7- 33:
Weight - 10 lbs.
3 normal stools. - Urine clear.

7 - 7 -33:
Weight - 10 lbs. 2 ozs.

Urine - slight trace of albumin.

4 slightly relaxed yellow stools.

Baby discharged looking very fit and slightly sunburnt, and in a very good condition.

- - - -

Progress Notes;

Seen by me as an Out Patient on the 18-9-33.

Weight: 14 lbs. 12½ ozs. and baby in an excellent condition.

## S U M M A R Y  of  C A S E  I.

In this case skin sepsis appeared on the 5th day, and was followed later by intermittent pyuria and gastrointestinal disturbance of a mild degree. The weight was maintained fairly well throughout. There was no history of instrumental labour or puerperal sepsis here, though it is evident that infection occurred at or soon after birth. The blood showed a minor degree of anæmia with a good haemoglobin level.

Blood Charts are appended here.

Chart 1a.

Name: Norah A.

## WEEKLY BLOOD COUNTS

| Date | Haemoglobin | Red Blood Corpuscles | Colour Index | White Blood Corpuscles | Reticulocytes |
|---|---|---|---|---|---|
| | % | per cmm. | | per cmm. | % |
| 23-5-33 | 87 | 4,750,000 | .9 | 11,800 | 1 |
| 29-5-33 | 80 | 4,500,000 | .8 | 10,000 | .8 |
| 5-6-33 | 75 | 4,000,000 | .9 | 10,000 | .6 |
| 12-6-33 | 75 | 4,000,000 | .9 | 10,600 | 2.5 |
| 19-6-33 | 73 | 4,250,000 | .8 | 8,000 | 2.5 |
| 26-6-33 | 75 | 4,200,000 | ,9 | 10,000 | 3 |
| 3-7-33 | 80 | 4,200,000 | .9 | 10,000 | 1.5 |

Name: Norah A.

CHART 1b.

DIFFERENTIAL COUNTS. Haemogram (Schilling)

Leishman Stain.

| Date | Total White Count | Myelocytes % | Metamyelocytes % | Band forms % | Segmental forms % | Total % |
|---|---|---|---|---|---|---|
| | | Neutrophile Leucocytes | | | | |
| 23-5-33 | 11,800 | .5 | 12 | 32 | 8.5 | 53 |
| 26-5-33 | | 0 | 4 | 40 | 10 | 54 |
| 29-5-33 | 10,000 | 0 | 7 | 20 | 6 | 33 |
| 5-6-33 | 10,000 | 0 | 14 | 32.5 | 4.5 | 51 |
| 6-6-33 | 10,600 | 0 | 7 | 46 | 5 | 58 |
| 12-6-33 | | 0 | 5.5 | 29.5 | 3.5 | 38.5 |
| 19-6-33 | 8,000 | 0 | 2.5 | 14.5 | 5 | 22 |
| 24-6-33 | | 0 | 2 | 26 | 3 | 31 |
| 26-6-33 | 10,000 | 0 | 7.5 | 30 | 2.5 | 40 |
| 3-7-33 | 10,000 | 0 | 2 | 19 | 3.5 | 24.5 |

| | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles. % |
|---|---|---|---|---|
| 23-5-33 | 40 | 6 | 2 | 0 |
| 26-5-33 | 40 | 6 | 2 | 0 |
| 29-5-33 | 60 | 2 | 1.5 | 0 |
| 5-6-33 | 44 | 4 | 2 | 0 |
| 6-6-33 | 42 | 2 | 1 | 0 |
| 12-6-33 | 58 | 0 | 3 | 1 |
| 19-6-33 | 75 | .5 | 2 | 0 |
| 24-6-33 | 68 | 0 | 2 | 0 |
| 26-6-33 | 57.5 | .5 | 2 | 0 |
| 3-7-33 | 67.5 | 3.5 | 4.5 | 0 |

C A S E  II.

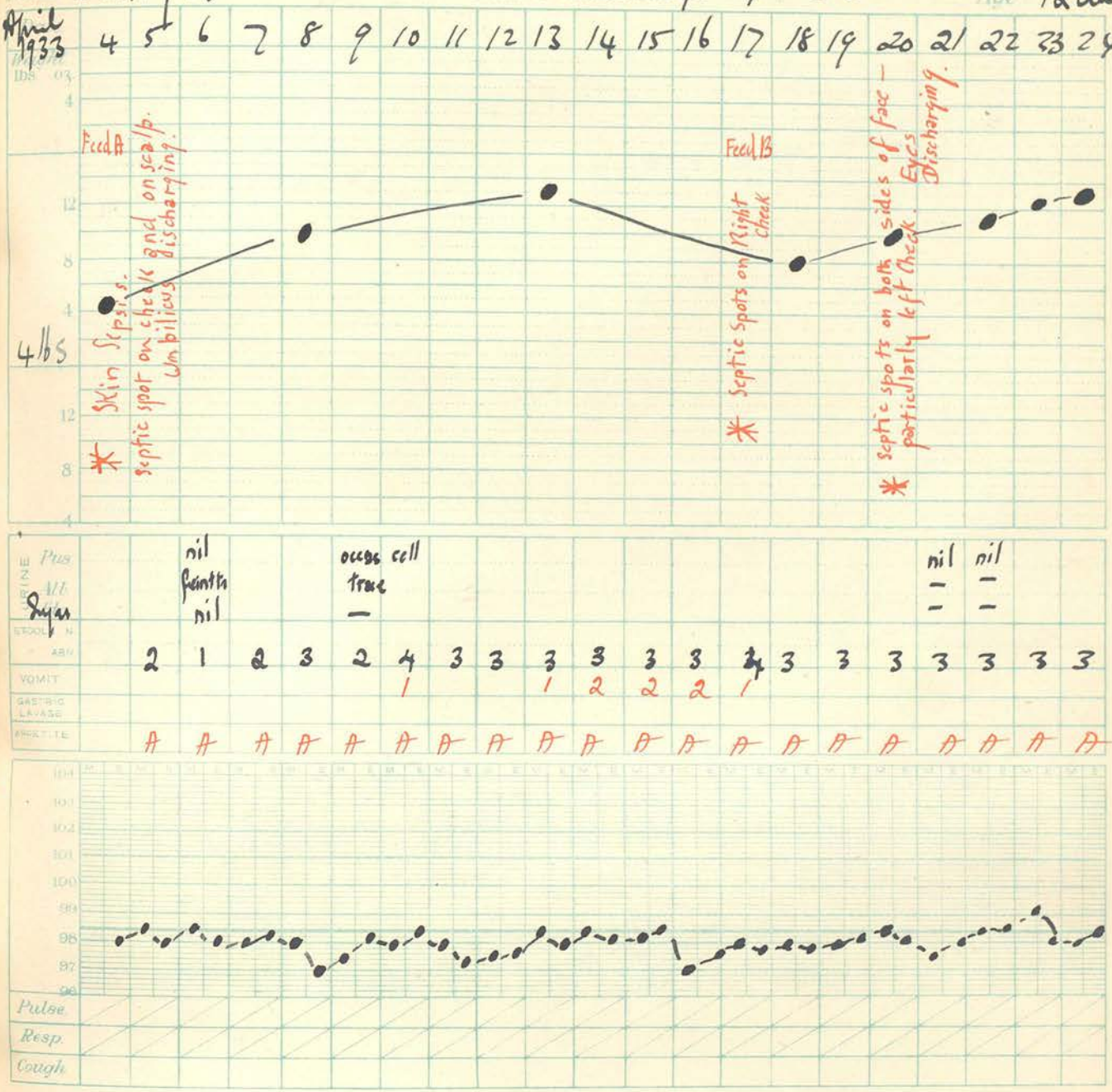
Charts 2a & 2b. & 2c.

Chart 2c.

Page 1.

THE BABIES' HOSPITAL NEWCASTLE

Name Emily R. Date of Admission 4.4.33 Age 12 days.




NOTES ON FEEDING

4.4.33. Feed A. 20 ozs (equal parts milk + water)
12 feeds: 7½% sugar

17.4.33 Feed B. Ostermilk No 1 5 ozs : 10 feeds

TREATMENT

Catheter fed.

From 17th April attempts are being made to encourage sucking by Bottle.

# THE BABIES' HOSPITAL NEWCASTLE

Name Emily R. Date of Admission 4·4·33 Age 1 month.

April 1933 | 25 | 26 | 27 | 28 | 29 | 30 | May 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15

Weight lbs oz

5lbs

4lbs.

Feed increased

Feed increased

Septic spots clearing up.

Pyuria.

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| URINE Pus | | | | | | | ++ trace — | | | | | — — — | | + trace — | | | | | | | — — — |
| Albumen | | | | | | | | | | | | | | | | | | | | | |
| STOOLS N | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | | 2 | 2 |
| ABN | | | | | / | | / | / | / | | | | | | / | | | | | | |
| VOMIT | | | | | | | | | | | | | | | | | | | | | |
| GASTRIC LAVAGE | | | | | | | | | | | | | | | | | | | | | |
| APPETITE | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |

Temperature: 104 103 102 101 100 99 98 97 96

Pulse

Resp

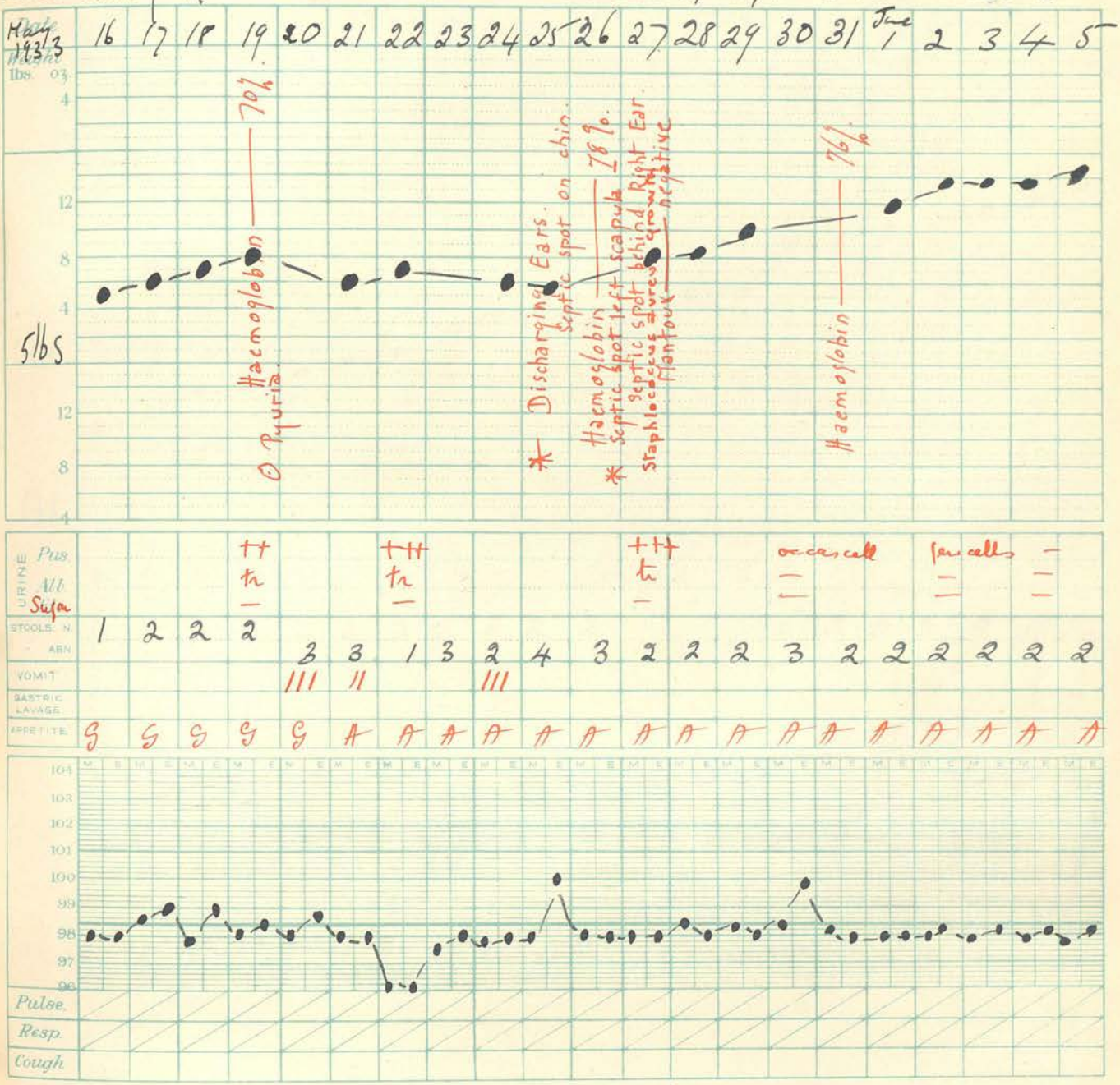
Cough

NOTES ON FEEDING 30·4·33 Ostermilk to 17½ ozs : 7 feeds
4·5·33. Ostermilk to 21 ozs : 7 feeds.

TREATMENT } Partially catheter fed & partially Bottle fed.

# THE BABIES HOSPITAL NEWCASTLE

Name Emily R. Date of Admission 4·4·32 Age 2 months

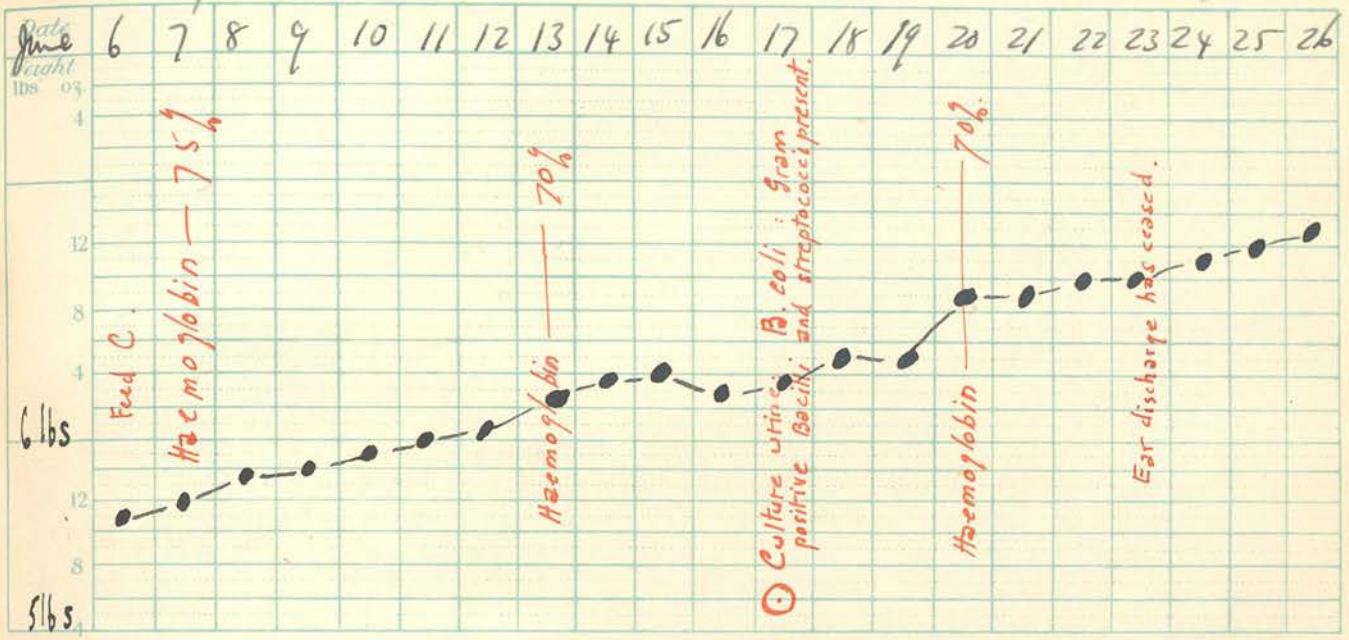


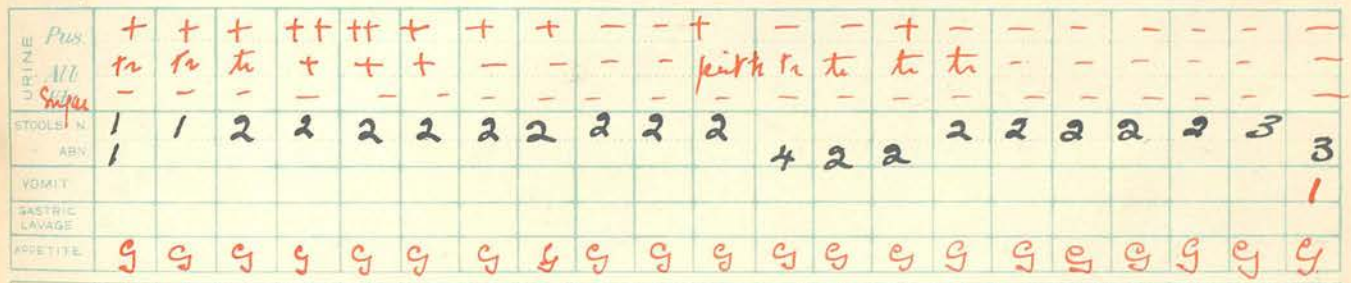

NOTES ON FEEDING

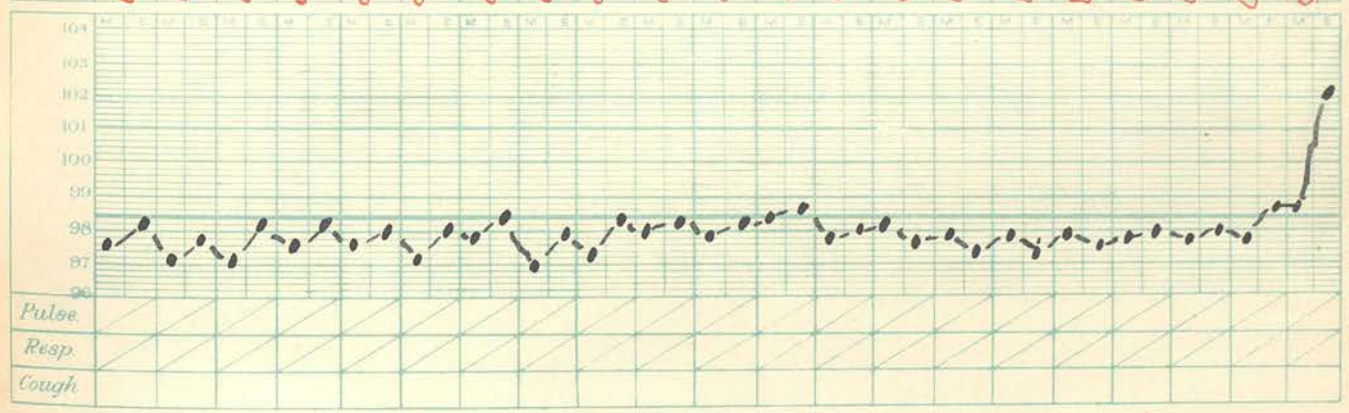
TREATMENT

# THE BABIES' HOSPITAL NEWCASTLE

Name Emily R  Date of Admission 4·4·33.  Age




NOTES ON FEEDING

6-6-33

6-6-33 Feed C. 28 ozs (4 parts milk & 2 of water): 7 feeds: 7½% sugar.

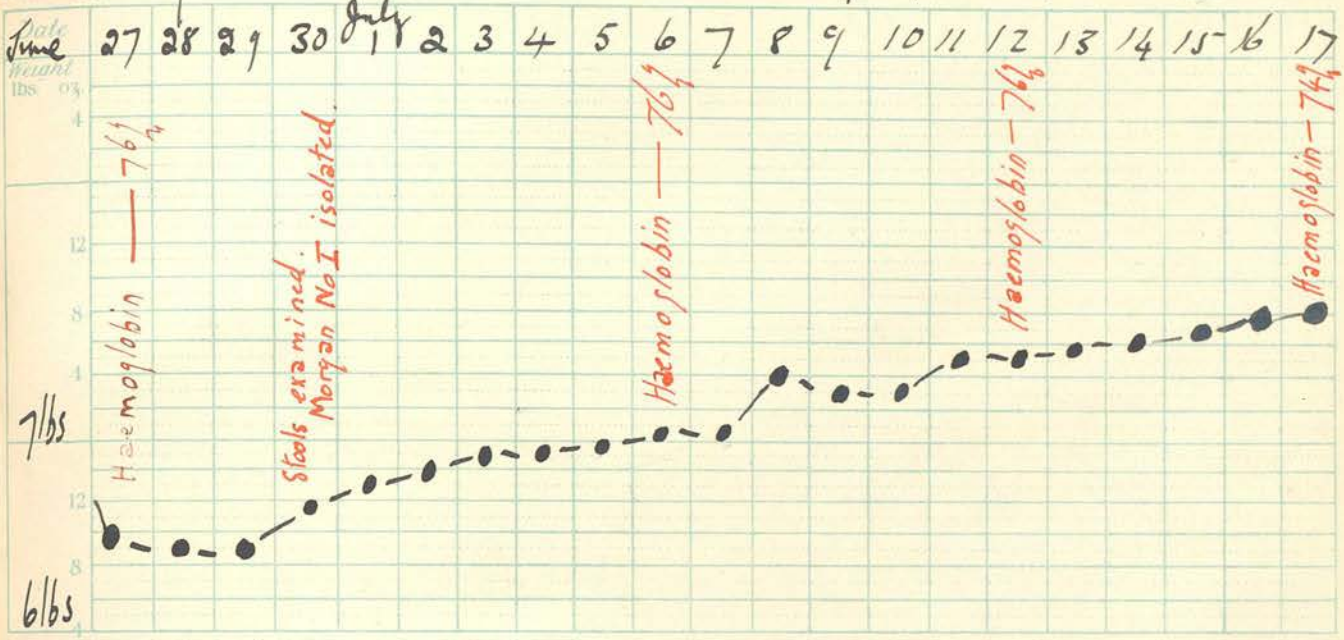
TREATMENT

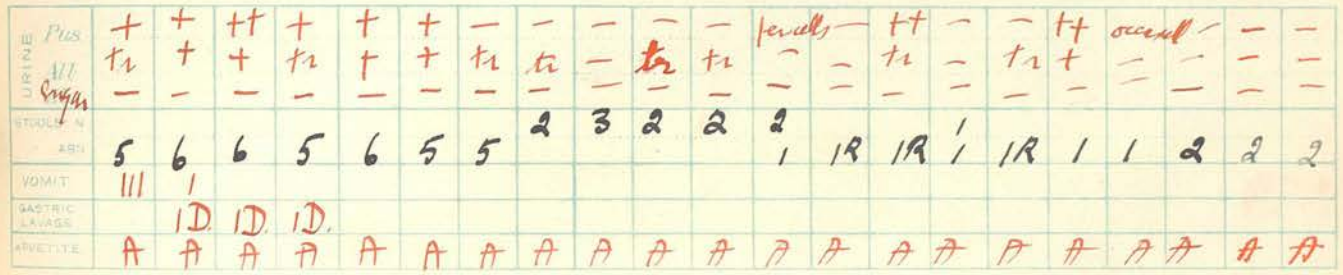
4.6.33.

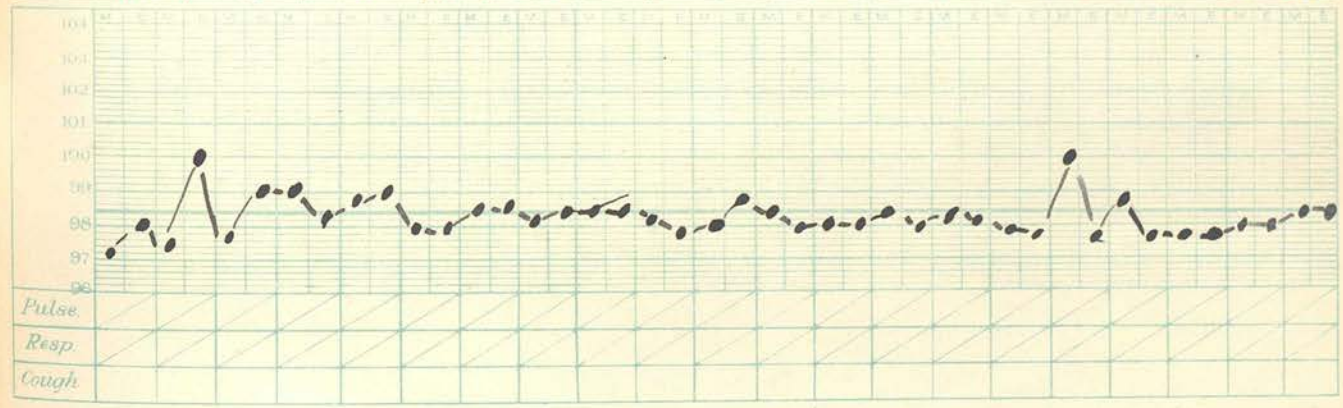
Mist Ferri et ammonium citrate. ℥ss t.i.d. (gr ii per dose i.e. gr 6 per day).

THE BABIES' HOSPITAL NEWCASTLE

Name Emily R. Date of Admission 4·4·33. Age




NOTES ON FEEDING

Feed: (No 4) 7½% sugar 28 ozs : 6 feeds.
Saline & Glucose in between feeds.

TREATMENT

29·6·33
℞. Mist Pot Cit 2ℨ 4hrly
(grs v).

14·7·33
℞. Mist Pot Cit. 2ℨℨ 4hrly.
(grs x).

# C A S E II.

Name: Emily R.

Age on Admission: 12 days.

Admitted: 4-4-33.

Reason for Admission:

I. Premature baby with difficulty in feeding.

Family History:

Mother aged 38 years: alive and well; very poor and dirty type of woman.

Father aged 37 years; alive and well.

No miscarriages.

7 children: 5 alive : 2 dead.

1. 1st child died aged 14 days - fits.
2. aged 16 years : well.
3. " 14 " : well.
4. died aged 4 days - fits.
5. aged 8 years: well.
6. " 4 years : takes fits.
7. present child - aged 9 days.

No family history of epilepsy.

No chest trouble in the family.

Present History:

7th child - 3 weeks premature (8 months 1 week conception). Normal easy labour: little haemorrhage afterwards.

Baby not cyanosed at birth.

Puerperium - normal.

Baby has not had any convulsions - Not weighed at birth.

Jaundice very slight at birth and tinge still present on admission.

On 4th day after birth mother noticed a small spot on cheek to which she attached no importance. On 5th day a similar spot appeared on head.

Breast fed irregularly for 7 days - appeared to suck quite well- but commenced to vomit after feeds.

The vomit was slight - and not large in amount.

On 8th day baby altogether refused breast - mother then commenced artificial feeding with Angel milk zi to a few ounces of water. This was retained without any return.

Motions - frequent: yellow: no mucus in them.

Husband unemployed: weekly income 27/-;

2 rooms in house. 3 occupants in each room.

Mother, who is a bad judge, says rooms are airy and well ventilated.

Examination:

Weight on admission - 4 lbs 5 ozs.

A small quite well developed premature baby with slight icteric tinge of skin.

Sclerae clear and mucous membranes bear no trace of jaundice.

Anterior fontanelle admits 2½ finger tips.

Circumference of head - 13½".

Length - heel to occiput - 18".

Mouth - clean. Tongue - moist and clean.

Fauces: no enlargement of tonsils.

No aural or nasal discharge.

Umbilicus - slight discharge.

Skin sepsis: Small circular septic spot on left cheek and a similar one on scalp.

Chest: Heart: Resting rate 148 per minute.

No mumurs: Sounds - closed and pure in all areas.

Lungs: Resonant throughout. Good air entry.

No accompaniments to breath sounds.

Abdomen: There is no loss of subcutaneous fat.

Spleen not palpable. No hepatic enlargement.

Buttocks: red, sore and bleeding.

Central Nervous System: Pupils circular: equal in size: react to light. Knee jerks present: equal on both sides.

5-4-33:

2 small relaxed stools - yellow in colour.

Baby unable to suck and is fed by catheter.

20 ozs. of milk and water in 12 feeds.

6-4-33:

Urine: Trace of Albumen: No sugar or pus.

7-4-33:

2 small yellow,relaxed stools.

8-4-33:

Weight up to 4 lbs. 9 ozs.

3 Stools greenish yellow.

9-4-33:

Urine : occasional pus cell.

Trace of Albumen: no Sugar.

10-4-33:
4 greenish, yellow stools. 1 vomit - whole of one feed.

11-4-33:
3 relaxed, yellow stools.

12-4-33:
3 relaxed, yellow stools.

13-4-33:
Weight up to 4 lbs. 13 ozs.
Improving in general condition. 3 stools - yellow, relaxed. 1 vomit.

14-4-33:
3 stools, greenish yellow. 2 vomits.

15-4-33:
3 stools, greenish yellow. 2 vomits.

16-4-33:
3 stools, greenish yellow. 2 vomits.

17-4-33:
4 stools greenish, yellow. 1 vomit.
Feed changed to 15 ozs. of Ostermilk. 10 feeds and still given by catheter, as baby is unable to suck - though attempts are being made to encourage sucking at bottle.
Several septic spots have now appeared on the right cheek. They are red, raised, and have a tiny pustular centre.

18-4-33:
Drop in weight to 4 lbs. 8 ozs.
3 yellowsih, green stools.

19-4-33:
3 yellow,green stools.

20-4-33:
The septic spots have now spread to left side of face, and are particularly to be seen on left cheek. The eyes have commenced to discharge. There is a degree of blepharitis: lower eyelids red and angry looking.

21-4-33:
Urine: No Albumen, Sugar or pus.
3 greenish, yellow stools.

22-4-33:
Urine: No Albumen, Sugar or pus.
3 greenish, yellow stools.

23-4-33:
Weight is commencing to go up.
3 yellow, green stools.

24-4-33:
3 yellow, green stools.

25-4-33:
Weight - 4 lbs 12 ozs.
Appetite good: baby keen on food.
2 slightly, relaxed yellow stools.

26-4-33:
Weight - 4 lbs. 13 ozs.
2 slightly relaxed yellow stools.

27-4-33:
Weight - 4 lbs 14 ozs.
2 slightly relaxed yellow stools.

28-4-33:
Weight - 4 lbs 14 ozs.
3 slightly relaxed yellow stools.

29-4-33:
Weight 4 lbs. 14 ozs.

2 slightly relaxed yellow stools. 1 small vomit.

30-4-33:
Food increased to 17½ ozs. Ostermilk. 7 feeds.
Baby is partially catheter fed and partially bottle fed. Takes one or two bottles. Very slow in sucking.

1-5-33:
Urine: Microscopically numerous pus cells.
Trace of Albumen: No Sugar.

2 yellow relaxed stools. 1 vomit.

2-5-33:
2 yellow, relaxed stools. 1 vomit.

Weight stationary.

3-5-33:
2 yellow, relaxed stools. 1 vomit.

4-5-33:
2 yellow, relaxed stools.

There is a distinct improvement in facial appearance.
The septic spots appear to be drying up.

Weight: 4 lbs. 14 ozs. Feeds increased to 21 ozs.
of Ostermilk: 7 feeds.

5-5-33:
Septic spots clearing up. Baby is now entirly bottle fed.

6-5-33:
Urine: contains no Albumen, Sugar or pus.

7-5-33:
1 slightly relaxed stool.

8-5-33:
Urine: microscopically pus present.
Trace of Albumen. No Sugar.

9-5-33:
Weight: 5 lbs. 1 oz.

1 normal stool and 1 relaxed stool.

Baby is sucking bottle fairly well and there is a distinct general improvement.

10-5-33:
2 normal stools.

Appetite good and steady increase in weight.

11-5-33:
2 normal stools.

Appetite good and steady increase in weight.

12-5-33:
2 normal stools.

Appetite good and steady increase in weight.

13-5-33:
No stools.

Appetite good and steady increase in weight.

14-5-33: 2 normal stools.

Appetite good and steady increase in weight.

15-5-33:
Weight : 5 lbs. 3 ozs.

Urine: No Albumen, Sugar or pus.

2 normal stools.

16-5-33:
1 normal stool.

Weight steadily going up.

17-5-33:
2 normal stools.

Weight steadily going up.

18-5-33:
2 normal stools.

Weight steadily going up.

19-5-33:

Weight: 5 lbs. 8 ozs.

Urine: Microscopically abundant pus cells:

Trace of Albumen: No Sugar.

Examination of Blood:

Haemoglobin 70%

Red Blood Corpuscles: 4,000,000 per cmm.

Colour Index .8

White Blood Corpuscles: 9,300 per cmm.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 7% | Total 21% |
| Band forms | 10% | |
| Segmental forms | 4% | |
| Lymphocytes | 70% | |
| Monocytes | 9% | |
| Eosinophiles | 1% | Total 3% |
| Preeosinophiles myelocytes | 2% | |

The red blood cells are quite well filled.

20-5-33:

3 yellowish, green stools. 3 vomits.

Loss of 2 ozs. in weight.

21-5-33: 3 yellowish, green stools. 2 vomits.

Loss of 2 ozs. in weight.

22-5-33:

Urine: microscopically: abundant pus cells.

Trace of Albumen: No Sugar.

1 relaxed stool.

Appetite, average. Baby has lost keenness shown before for feeds.

23-5-33:
3 yellow, relaxed stools.

Appetite, average. Baby has lost keenness shown before for feeds.

24-5-33:
2 yellow, relaxed stools. 3 small vomits.

Weight: 5 lbs. 6 ozs.

25-5-33:
Both ears are discharging. A freshseptic spot has appeared on the chin.

Stools more frequent: 4 relaxed, yellowish green.

Temperature: 100.4°.

26-5-33 - 27-5-33: There is a further outburst of septic spots. One has appeared on left scapula. One behind pinna of right ear. The scalp is reddish in colour - though there are no further septic spots. The Buttocks are not excoriated, but very red.

Examination of pus from septic spots: Staphylococcus aureus found.

26-5-33:
Examination of Blood:

Haemoglobin 78%

Red Blood Corpuscles: 4,300,000 per cmm.

Colour Index .9

White Blood Corpuscles: 15,000 per cmm.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 9% | Total 31% |
| Band forms | 21% | |
| Segmental forms | 1% | |
| Lymphocytes | 63% | |
| Monocytes | 4% | |
| Eosinophiles | 1.5% | Total 3% |
| Preeosinophiles myelocytes | 1.5% | |

27-5-33:

Urine: microscopically abundant pus cells.

Trace of Albumen: No Sugar.

2 yellow, relaxed stools.

Mantoux : Negative.

28-5-33 - 29-5-33: 2 yellow relaxed stools with mucus in them. Weight commencing to go up.

30-5-33:

Occasional pus cells in urine.

No Albumen: No Sugar.

3 yellow stools with mucus in them.

31-5-33: Examination of Blood:

Haemoglobin 76%

Urine: occasional pus cells.

1-6-33:

2 yellow, relaxed stools with mucus in them in 24 hours. Urine: few pus cells.

2-6-33:

2 yellow, relaxed stools with mucus in them in 24 hours. Urine: few pus cells.

3-6-33:
2 yellow, relaxed stools with mucus in them in 24 hours. Urine : few pus cells.

4-6-33:
2 yellow, relaxed stools with mucus in them in 24 hours. Urine: few pus cells.

5-6-33:
2 yellow relaxed stools with mucus in them in 24 hours. Urine: few pus cells.

Weight up to 5 lbs. 14 ozs.

4-6-33:
Put on to 2 grs. of iron three times per day.

6-6-33:
Feed increased to 28 ozs. of milk and water mixture. 7 feeds. Appetite is good. Baby is keen for food.

The general condition appears to be improving.

Urine: microscopically pus cells in fair amount.
Trace of Albumen: No Sugar.

1 normal stool. 1 yellow relaxed stool with mucus in it.

7-6-33:
Urine: contains pus cells:
Trace of Albumen:

1 normal stool in past 24 hours.

Examination of Blood:
Haemoglobin 75%
Red Blood Corpuscles: 4,400,000 per cmm.
Colour Index .9
White Blood Corpuscles: 12,000 per cmm.
Reticulocytes 2%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 4% | Total 35% |
| Band forms | 28% | |
| Segmental forms | 3% | |
| Lymphocytes | 60% | |
| Monocytes | 3% | |
| Eosinophiles | 2% | Total 3.5% |
| Preesinophiles myelocytes | 1.5% | |

Some of the red cells show poikilocytosis.

Hypochromia marked in parts.

8-6-33 - 12-6-33: Weight is steadily going up on 11-6-33 has reached 6 lbs.

Urine contains good deal of pus cells:

Trace of Albumen.

Stools are normal now - 2 per day - yellow.

13-6-33: Examination of Blood:

Haemoglobin 70%

Red Blood Corpuscles: 3,750,000 per cmm.

Colour Index .9

White Blood Corpuscles: 8,000 per cmm.

Reticulocytes - very few in 600 cells - cannot be recorded as a percentage.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 5% | Total 35% |
| Band forms | 28% | |
| Segmental forms | 2% | |
| Lymphocytes | 58% | |
| Monocytes | 2% | |
| Eosinophiles | 4% | Total 5% |
| Preeosinophiles myelocytes | 1% | |

Urine: contains pus cells.

2 normal stools.

Weight up to 6 lbs. 3 ozs.

General improvement marked. Child has been put out on balcony. Complexion good. Baby smiles and appears happy.

14-6-33 - 15-6-33: Urine clear. 2 normal stools.

16-6-33: Urine : pus re-appearing.

Trace of Albumen: No Sugar.

2 normal stools.

17-6-33: Urine: has trace of Albumen.

No pus.

4 relaxed stools - yellow. No mucus.

Bacteriological report of specimen of Urine: Uniformly turbid urine. Slightly alkaline.

Direct Films. Some pus cells and epithelial cells present. Very numerous motile Gram negative bacilli: Gram positive bacilli and streptococci present.

No acid-fast (T.B.) organisms seen.

Cultures: B. coli:

Gram positive bacilli & streptococci present.

18-6-33:

Urine: Trace of Albumen.

2 yellow, relaxed stools with mucus in them.

19-6-33:

Urine: microscopically pus present.

Trace of Albumen.

2 yellow, relaxed stools with mucus in them.

20-6-33:

Urine: Trace of Albumen.

2 normal stools.

Weight up to 6 lbs 9 ozs.

Examination of Blood:

Haemoglobin 70%

Red Blood Corpuscles: 4,000,000 per cmm.

Colour Index .8

White Blood Corpuscles: 9,000 per cmm.

Reticulocytes 2%

Differential Count:

| | | | |
|---|---|---|---|
| Metamyelocytes | 3% | ) | |
| | | ) | |
| Band forms | 32% | ) | Total 37% |
| | | ) | |
| Segmental forms | 2% | ) | |
| Lymphocytes | 60% | | |
| Monocytes | 1% | | |
| Eosinophiles | 4% | | |
| Basophiles | 0% | | |

Red cells showed hypochromia.

21-6-33 - 22-6-33:
Weight steadily increasing.

2 normal stools per day. General condition good.

Urine : clear. No Albumen and no Sugar or pus.

23-6-33:
Weight steadily increasing. Ear discharge has ceased. 2 normal stools per day. General condition good. Urine: clear. No Albumen and no Sugar or pus.

24-6-33:
Weight steadily increasing. 2 normal stools per day. General condition good.

Urine: clear. No Albumen and no Sugar or pus.

25-6-33.
3 normal stools.

26-6-33.
Temperature up to 102°.

No physical signs in chest.

3 relaxed, yellow stools with mucus in them.

1 vomit. No evidence of fresh infection.

Urine: clear . No Albumen and no Sugar or pus.

27-6-33:

Urine: has pus cells.

Trace of Albumen. No Sugar.

Stools 5 in number. Greenish, yellow, relaxed.

Baby has vomited 3 times.

Weight down a little. There is a slumpperiod now.

Examination of Blood:

| | | |
|---|---|---|
| Haemoglobin | 76% | |
| Red Blood Corpuscles: | 4.250,000 per cmm. | |
| Colour Index | .9 | |
| White Blood Corpuscles: | 12,000 per cmm. | |
| Reticulocytes | 1% | |
| Differential Count: | | |
| Metamyelocytes | 21% | ) |
| | | ) |
| Band forms | 8% | ) Total 31% |
| | | ) |
| Segmental forms | 2% | ) |
| Lymphocytes | 62% | |
| Monocytes | 4% | |
| Eosinophiles | 1% | |
| Basophiles | 0% | |

28-6-33:

Urine: contains pus.

Stools - 6 in number. Greenish, yellow. No curds, mucus or blood in them. 1 large vomit.

Gastric lavage done: return very dirty.

Temperature up to 100°.

29-6-33:

Urine: microscopically more pus.

Stools still 6 in number. Yellowish, green.

Another dirty return in gastric lavage.

Pot. Citrate grs. V, t.i.d. given to clear up urine.

30-6-33:

Urine: contains pus.

5 greenish yellow stools. 1 dirty gastric lavage.

Baby a little dehydrated looking.

Saline and glucose given in between feeds by mouth.

Bacteriological Examination of stools: Report as follows:-

B. typhosus: B. paratyphosus: B. dysenteriae and other organisms of the food poisoning group are not present.

Morgan No.I isolated.

1-7-33:

6 greenish yellow stools. More normal in appearance than previously.

Baby is gaining weight,

Urine: still contains pus.

2-7-33:

5 stools - very small. Yellow, relaxed and no mucus.

Urine: contains pus.

3-7-33:
Urine: Trace of Albumen and no pus.

5 stools, very small. Yellow, relaxed. No mucus.

Weight is steadily going up and baby is much brighter and taking feeds more eagerly.

4-7-33:
Urine: clear. Slight trace of Albumen.

2 normal stools.

5-7-33:
Urine: clear.

3 normal stools.

Weight 7 lbs.

6-7-33:
Urine: Trace of Albumen.

2 normal stools.

Weight 7 lbs. 1 oz.

General condition considerably improved.

Examination of Blood:

Haemoglobin 76%

Red Blood Corpuscles: 3,950,000 per cmm.

Colour Index .9

White Blood Corpuscles: 8,000 per cmm.

Reticulocytes several in field - inadequate to be expressed as a percentage.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 1.5% | |
| Band forms | 32 % | Total 33.5% |
| Segmental forms | 0 % | |

Lymphocytes 62.5%

Monocytes 3 %

Eosinophiles 1.5%

Red cells show hypochromia and one nucleated red cell seen in whole field.

7-7-33:

Urine: Trace of Albumen.

2 normal stools.

Weight maintained.

8-7-33:

Urine: Few cells seen.

Weight - 7 lbs 4 ozs.

3 stools. 2 normal ones and 1 yellow, relaxed.

Baby is doing very well.

9-7-33:

Urine: clear.

1 relaxed stool.

10-7-33:

Urine: pus has reappeared.

1 relaxed, yellow stool.

Weight - 7 lbs. 3 ozs.

11-7-33:

Urine: clear.

1 normal stool and 1 relaxed stool.

Weight - 7 lbs 5 ozs.

12-7-33:

Urine: Trace of Albumen.

1 relaxed stool. No mucus.

12-7-33;
Examination of Blood:

Haemoglobin 76%

Red Blood Corpuscles: 4,000,000 per cmm.

Colour Index ,9

White Blood Corpuscles: 8,000 per cmm.

Reticulocytes few are seen, but insufficient to be recorded as a percentage.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 2% | Total 40% |
| Band forms | 36% | |
| Segmental forms | 2% | |
| Lymphocytes | 60% | |
| Monocytes | 1% | |
| Eosinophiles | 1% | |

13-7-33:
Urine: pus has returned.
i yellow, relaxed stool.
Temperature up to 100° -probably due to pus in urine.

14-7-33: Urine: occasional pus cells.
1 yellow, relaxed stool.
Pot. Cit. grs.X t.i.d. given.

15-7-33: Urine: quite clear.

16-7-33: Urine: quite clear.
Baby looks fit. Is beginning to take notice of her surroundings and has reached a weight of 7 lbs.7 ozs.

17-7-33:

Urine: clear. No pus. No Albumen.

Examination of Blood:

Haemoglobin 74%

Red Blood Corpuscles: 4,550,000 per cmm.

Colour Index .8

White Blood Corpuscles: 8,000 per cmm.

Reticulocytes 1%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 1% | Total 39% |
| Band forms | 35% | |
| Segmental forms | 3% | |
| Lymphocytes | 58% | |
| Monocytes | 1% | |
| Eosinophiles | 1% | |

Red cells show a degree of hypochromia.

Seen as an Out Patient on 21-7-33.

Fed on Ostermilk 2 teaspoonfuls to 2½ ozs.

Taking feeds well: There is no vomiting.

Motions regular. 2-3 per day: yellow.

28-7-33:

Baby has improved.

Weight: 7 lbs. 11 ozs. There is no evidence of any fresh sepsis. A tiny pin point toxic rash covers the body - but it is definitely not of septic origin.

## S U M M A R Y of C A S E II.

Skin sepsis in this premature infant appeared as early as the 4th day of life. In addition infective process spread to renal and gastrointestinal tracts - manifesting itself as an intermittent pyuria and digestive disturbance. Another feature of infection here was otorrhoea. There was no history of puerpal sepsis - though dirty home surroundings and uncleanliness in nursing of infant on the part of the Mother, must have been responsible for sepsis in this case. The haemoglobin remained within normal limits throughout - an anæmia of a mild degree only occurred.

Chart 2a.

Name: Emily R.

## WEEKLY BLOOD COUNTS.

| Date | Haemoglobin % | Red Blood Corpuscles per cmm. | Colour Index | White Blood Corpuscles per cmm. | Reticulocytes % |
|---|---|---|---|---|---|
| 19-5-33 | 70 | 4,000,000 | .8 | 9,300 | -- |
| 26-5-33 | 78 | 4,300,000 | .9 | 15,000 | -- |
| 7-6-33 | 75 | 4,400,000 | .9 | 12,000 | 2 |
| 13-6-33 | 70 | 3,750,000 | .9 | 8,000 | -- (few seen) |
| 20-6-33 | 70 | 4,000,000 | .8 | 9,000 | 2 |
| 27-6-33 | 76 | 4,250,000 | .9 | 12,000 | 1 |
| 6-7-33 | 76 | 3,950,000 | .9 | 8,000 | -- (few seen) |
| 12-7-33 | 76 | 4,000,000 | .9 | 8,000 | -- (few seen) |
| 17-7-33 | 74 | 4,550,000 | .8 | 8,000 | 1 |

CHART 2b.

Name: Emily R.

DIFFERENTIAL COUNTS. Haemogram (Schilling).

Leishman Stains.

| Date | Total White Count | Myelocytes % | Metamyelocytes % | Band forms % | Segmental forms % | Total % |
|---|---|---|---|---|---|---|
| | | Neutrophiles Leucocytes. | | | | |
| 19-5-33 | 9,300 | -- | 7 | 10 | 4 | 21 |
| 26-5-33 | 15,000 | -- | 9 | 21 | 1 | 31 |
| 7-6-33 | 12,000 | -- | 4 | 28 | 3 | 35 |
| 13-6-33 | 8,000 | -- | 5 | 28 | 2 | 35 |
| 20-6-33 | 9,000 | -- | 3 | 32 | 2 | 37 |
| 27-6-33 | 12,000 | -- | 21 | 8 | 2 | 31 |
| 30-6-33 | - | -- | 18.5 | 12.5 | 1 | 32 |
| 6-7-33 | 8,000 | -- | 1.5 | 32 | 0 | 33.5 |
| 12-7-33 | 8,000 | -- | 2 | 36 | 2 | 38 |
| 17-7-33 | 8,000 | -- | 1 | 35 | 3 | 39 |

| | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles % |
|---|---|---|---|---|
| 19-5-33 | 70 | 9 | 3 | 0 |
| 26-5-33 | 63 | 4 | 3 | 0 |
| 7-6-33 | 60 | 3 | 3.5 | 0 |
| 13-6-33 | 58 | 2 | 5 | 0 |
| 20-6-33 | 60 | 1 | 4 | 0 |
| 27-6-33 | 62 | 4 | 1 | 0 |
| 30-6-33 | 65 | 2.5 | .5 | 0 |
| 6-7-33 | 62.5 | 3 | 1.5 | 0 |
| 12-7-33 | 60 | 1 | 1 | 0 |
| 17-7-33 | 58 | 1 | 1 | 0 |

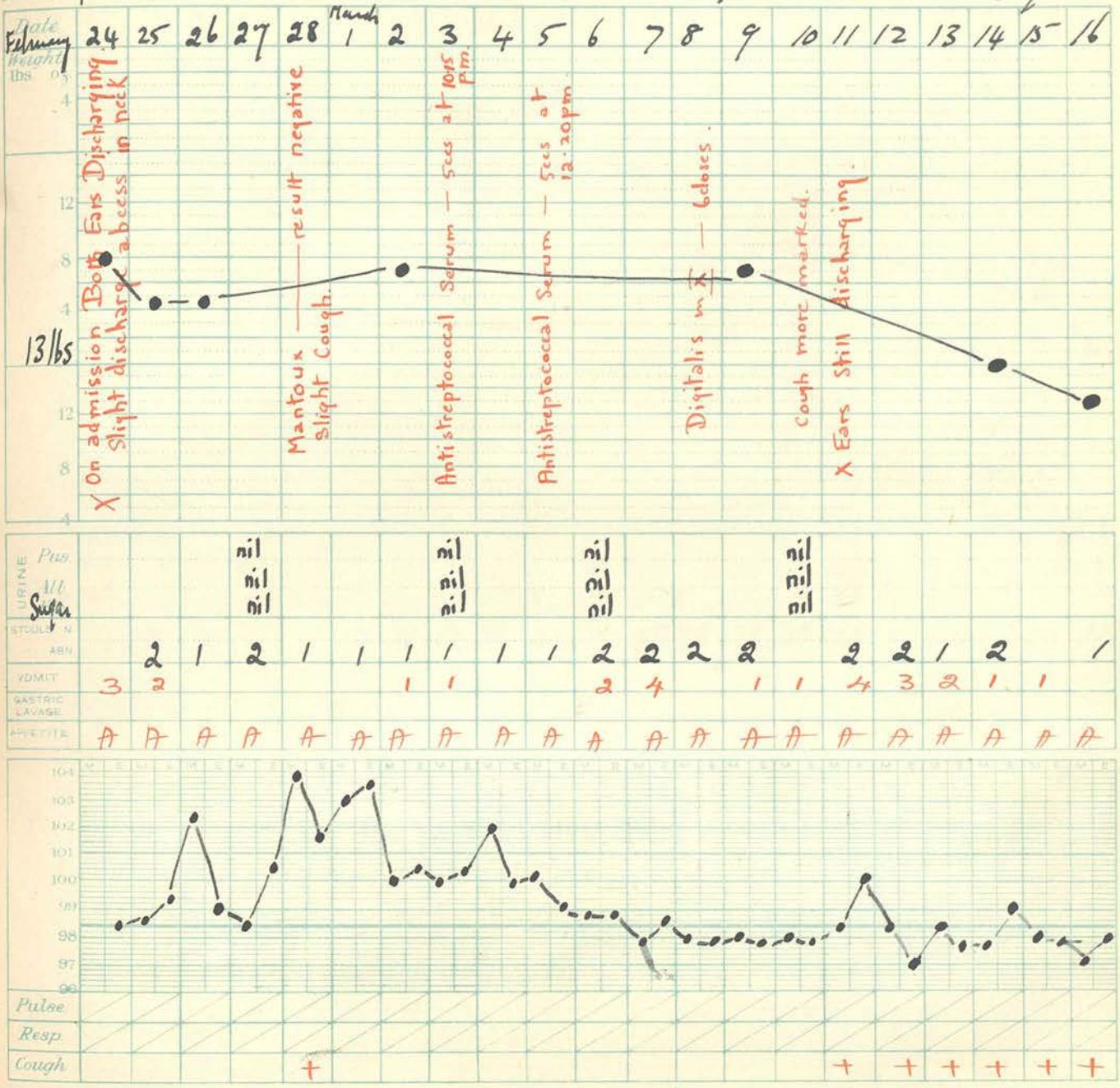
## C A S E  III.

Charts 3a. & 3b. & 3c.

Chart 3c. Page 1.

THE BABIES' HOSPITAL NEWCASTLE

Name Frank H. Date of Admission 24·2·33 Age 9 mths.




NOTES ON FEEDING

24·2·33. 24 ozs Milk (3 parts milk 1 part water).
7½% sugar to mixture.
Milk pudding.
Vegetable soup.
Groats.

TREATMENT

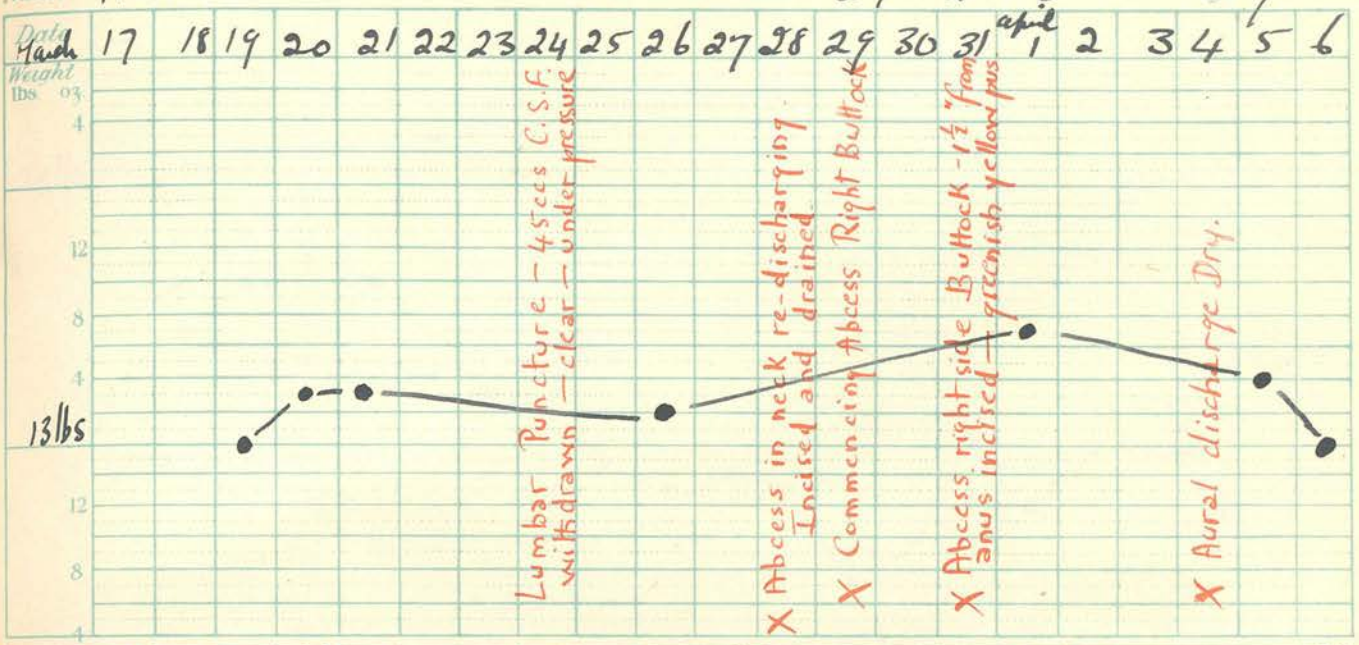
3·3·33.
Antistreptococcal Serum : 5ccs at 10·15pm.

5·3·33.
Antistreptococcal Serum : 5 ccs at 12·30pm

8·3·33. Digitalis m X : 6doses.

THE BABIES' HOSPITAL NEWCASTLE

Name Frank H. Date of Admission 24·2·33 Age 9 mths.

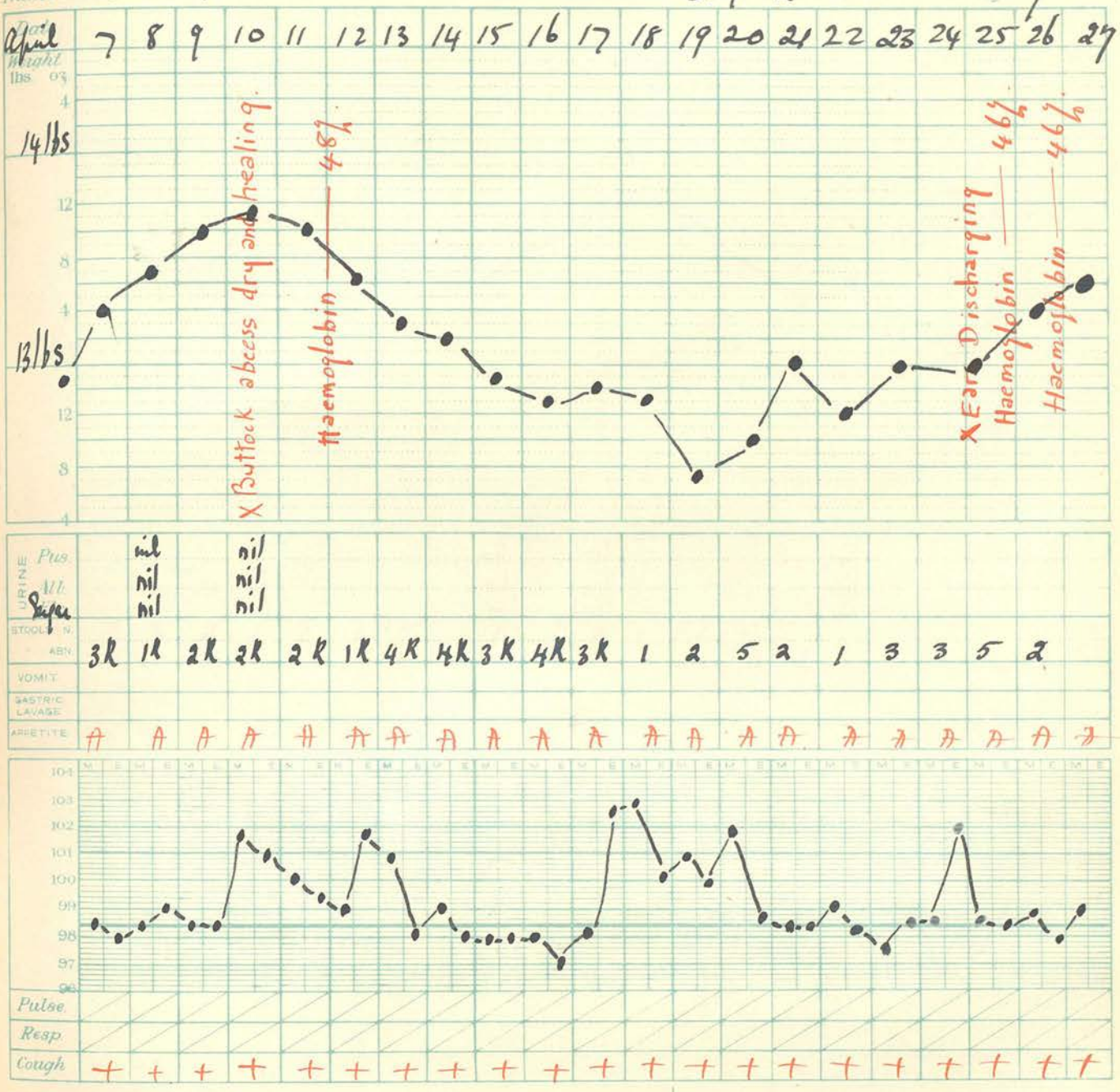




URINE Pus nil nil nil nil nil pint ½ nil nil nil nil nil

# THE BABIES' HOSPITAL NEWCASTLE

Name Frank H  Date of Admission 24·2·33  Age 9 mths.




NOTES ON FEEDING

TREATMENT

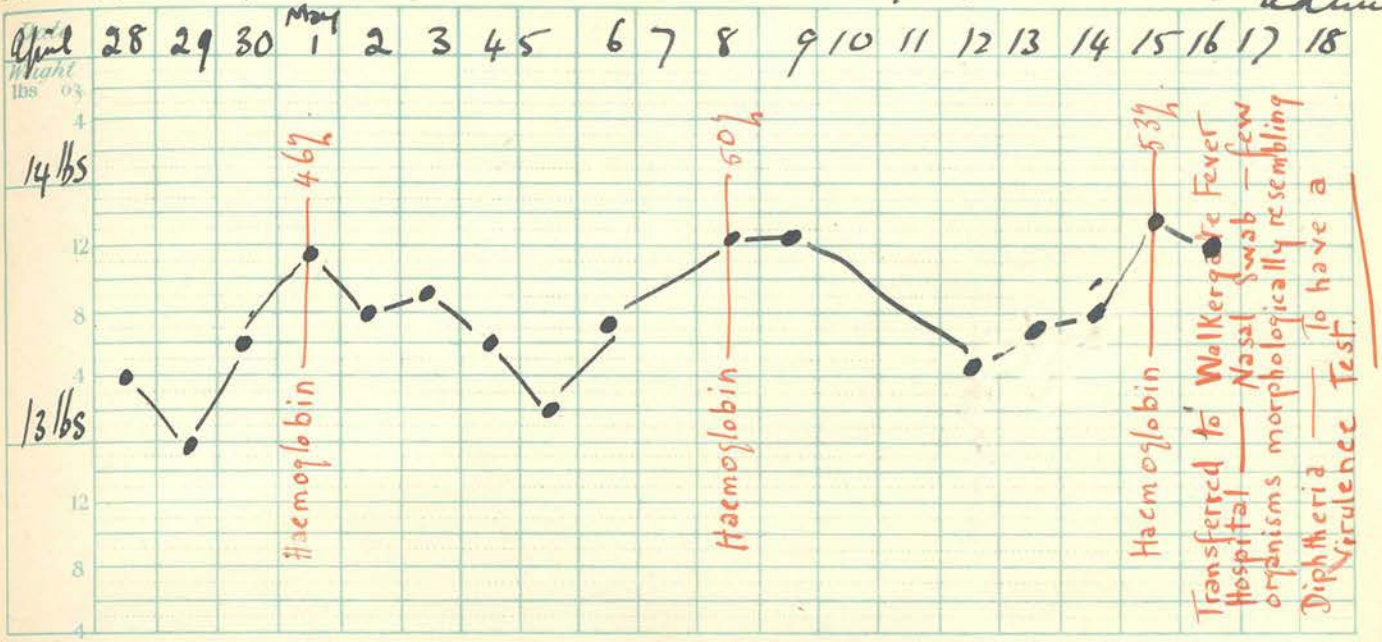
12·4·33.
℞. Mist Ferri et ammonium Citrate
(dose gr ii ad firm t.i.d.) — Total grs 6 per day

22·4·33.
℞. Mist Ferri et amm. Cit.
(gr ii b.d. / gr iv once daily) Total grs 8 per day

26·4·33
℞. Mist Ferri et amm Cit: Total grs 12 per day.
(grs iv t.i.d.)

THE BABIES' HOSPITAL NEWCASTLE

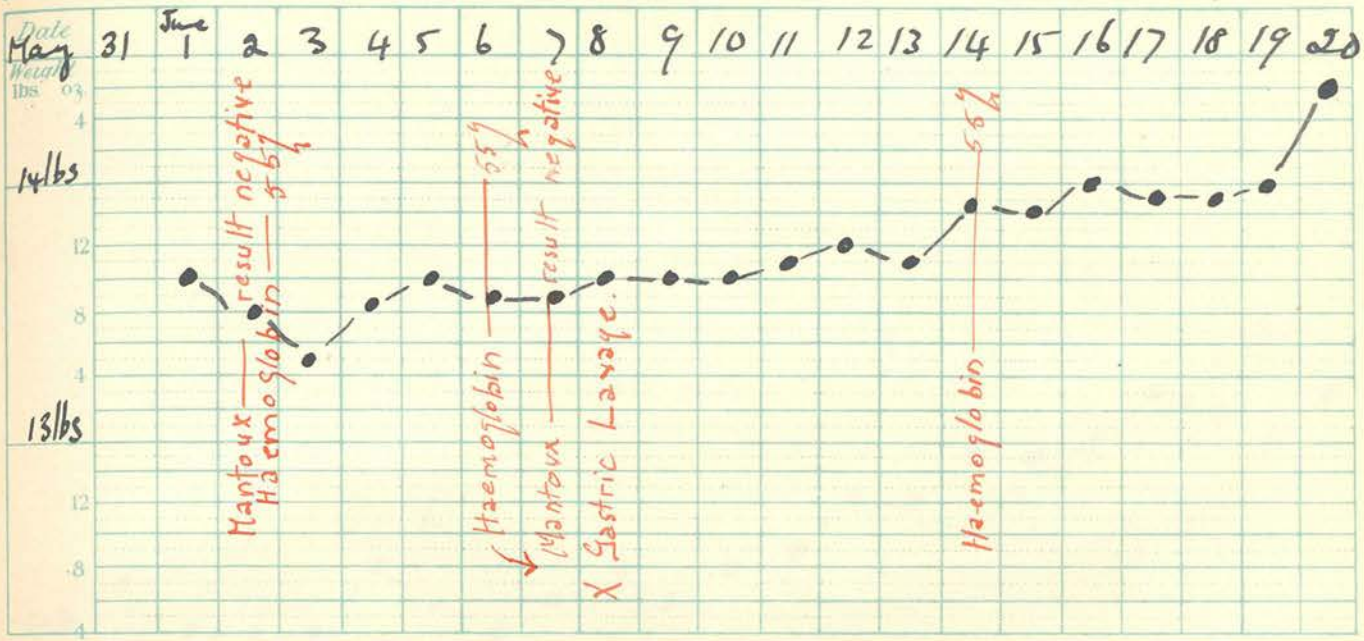
Name Frank H. Date of Admission 24·2·33 Age 9 mths-on admission



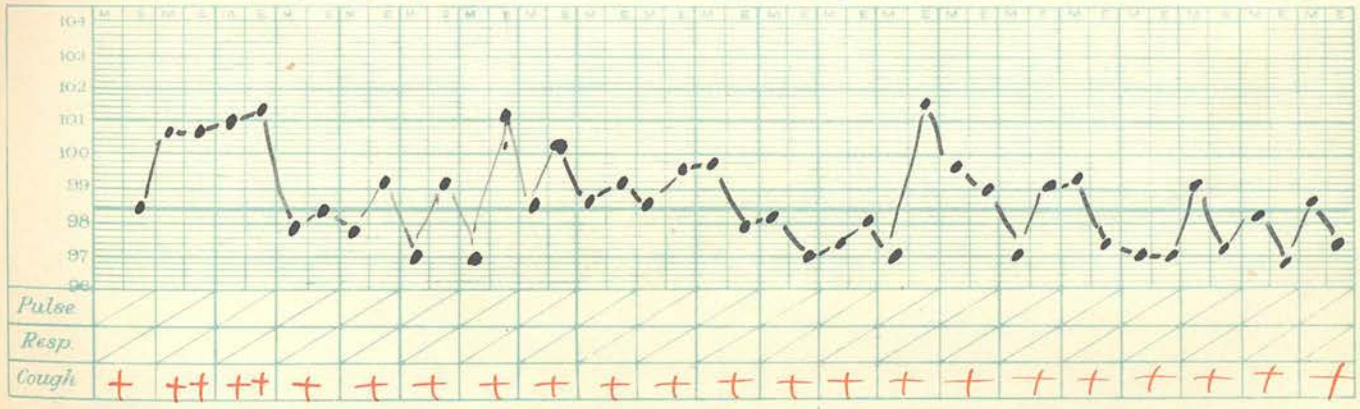

| | | |

THE BABIES' HOSPITAL NEWCASTLE

Name Frank H — Readmission — Date of Admission 31.5.33 — Age




| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| URINE Pus | | nil | | | | | | | | nil | | | nil | | | | | nil | | | | nil |
| Alb | | nil | | | | | | | | nil | | | nil | | | | | nil | | | | nil |
| Sugar | | nil | | | | | | | | nil | | | nil | | | | | nil | | | | nil |
| STOOLS N | | | | 2 | | 1 | | | | | | 1 | 1 | 1 | | | | | | | | |
| ABN | 3 | 1 | | | | | 2 | 1 | 1 | 1 | | | | | 1 | 2 | 4 | 2 | 1 | 1 | 2 | 2 |
| VOMIT | | | | | | | | | | | | | | | | | | | | | | |
| GASTRIC LAVAGE | | | | | | | | | 1 | | | | | | | | | | | | | |
| APPETITE | A | A | A | A | A | A | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |




NOTES ON FEEDING

Mixed Diet.

TREATMENT

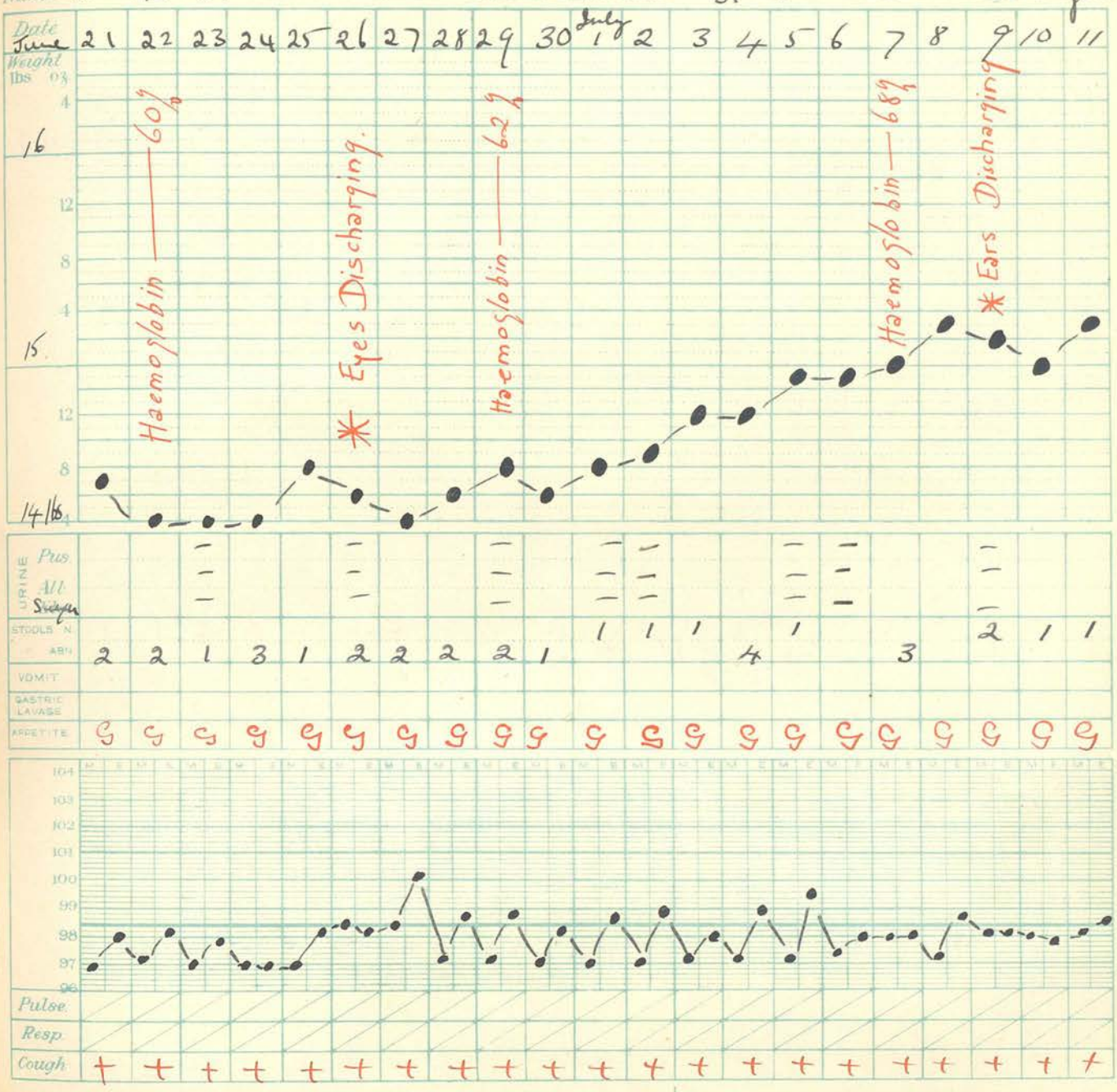
1.6.33.

℞ Mist Ferri et amm. Cit
(grs x t.i.d.)
Total grs 30 per day.

Cod liver oil zss t.i.d.

THE BABIES' HOSPITAL NEWCASTLE

Name Frank H. Date of Admission Readmission 31. 5. 33 Age 1 year.




NOTES ON FEEDING

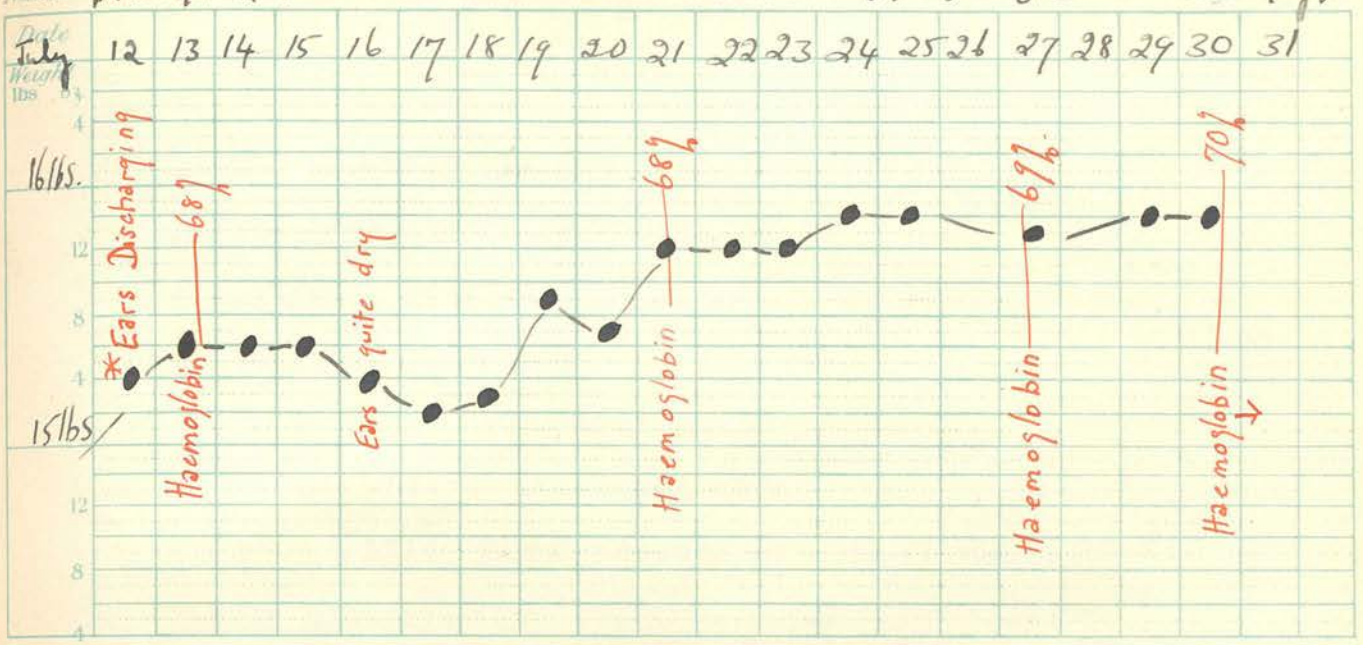
Mixed Diet.

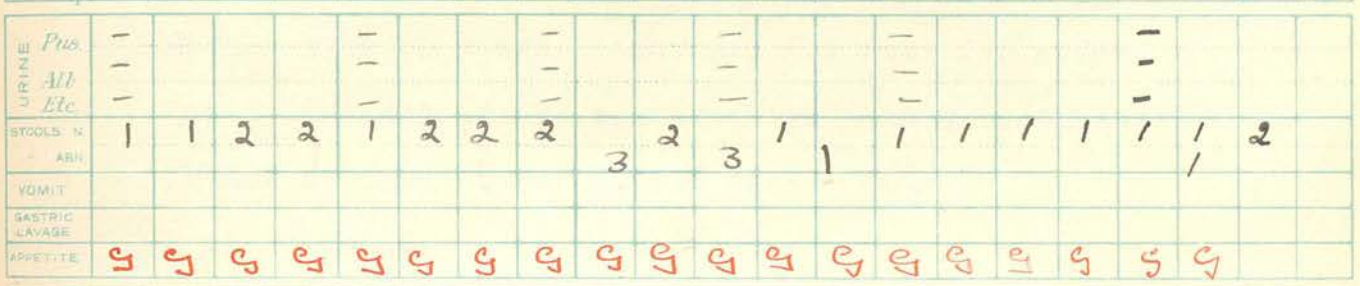
TREATMENT

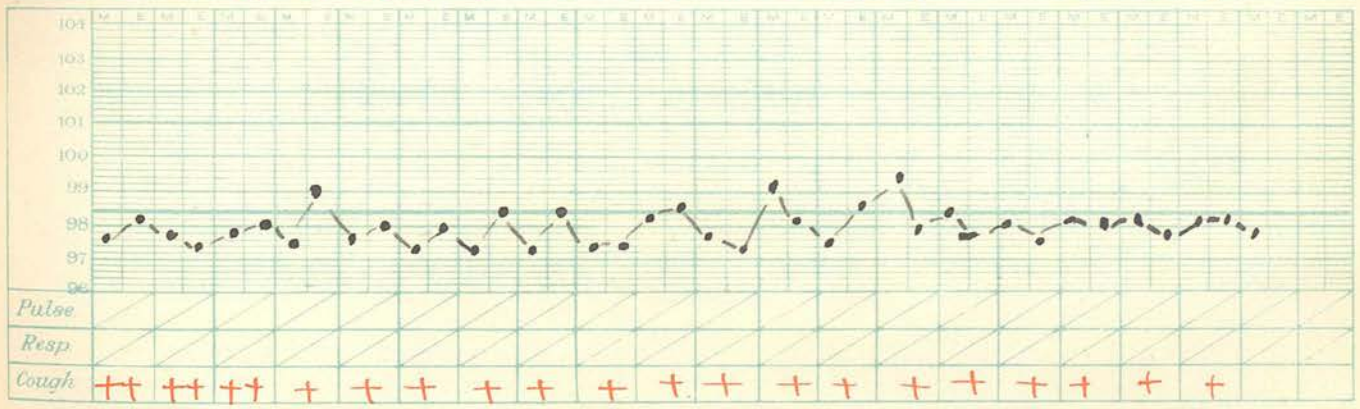
℞.
Mist Ferri et ammon. cit.
(℞ t.i.d.
30 grs per day).

# THE BABIES' HOSPITAL NEWCASTLE

Name Frank H. Date of Admission 31·5·33 Age 1 yr




NOTES ON FEEDING

Mixed Diet

TREATMENT

# C A S E  III.

Name: George William Francis H. (Abbreviated name - Frank H.)

Age on Admission: 9 months.

Admitted: 24-2-33

Reasons for Admission:

I. Not thriving.

II. Discharging ears.

III. Gland abscess at side of neck.

Family History:

Mother aged 30 years: anæmic for past few years.

Until 16 years of age was troubled with sore throats.

Father aged 29 years: quite well.

1 other child: girl aged 8 years.

3 years ago had ear trouble in the form of discharging ears following measles. Operated on for mastoid March 1933 - after which developed scarlet fever. Quite well now.

Married 9 years. No miscarriages.

No T.B. in family.

Present History:

Infant born on 19-5-32. Full time baby. Normal labour: short labour lasting 3-4hours after onset of pains.

Weight at birth: 6 lbs. 4 ozs.

No abnormal bleeding following delivery. Puerperium - rigors: temperature lasting 1 week - in bed for 3 weeks. Mother felt weak for a few months afterwards.

Baby cried soon after birth - not cyanosed: looked healthy

but thin.

Breast fed. Took breast well and thrived well.

Weighed fortnightly at Welfare Centre, and gained well.

Kept on breast till 9 months.

At 7 months Mother tried child on Ambrosia, which she was getting to improve her own condition, but this was refused, as well as any attempt at gravy or vegetables.

at 7 months child suddenly took ill - cold in head - neck appeared stiff - occasional vomit and remained ill for 14 days. Improvement set in, unfortunately Mother took influenza and child became affected with this as well.

This spell of illness lasted 1 month. Ears began to discharge - cough marked - loss of weight was noticed.

at 9 months very ill - cried a good deal for a fortnight - restless - irritable and fretful and then lump appeared on right side of neck, which was lanced on 23-3-33 - a day prior to admission to Babies' Hospital - where baby was weaned very soon after admission.

Examination on Admission:

A very pale, undersized baby. Weight - 13 lbs 8 ozs. Discharge from both ears in form of pale, yellow fluid. Several enlarged palpable glands in submaxillary region and anterior cervical region of neck. Abscess in neck discharging slightly. Throat - tonsils enlarged: no exudate: irregular in shape.

No skin sepsis.

Temperature on admission - 98.4°

Examination of Chest: Impairment of note left base.
Increased Vocal Resonance.
Alternation in breath sounds
and few accompanying
crepitations.

Heart: No hypertrophy. Sounds clear.

Impression: Resolving pneumonia with otorrhoea.
difficulty with weaning owing to poorly condition
of child.

Mantoux: negative.

26-2-33: Temperature - 102.6°

27-2-33: Urine; microscopically no pus, albumen or sugar.

28-2-33: Temperature - 104°.

Baby very quiet and very ill in appearance. Purpuric spot on right cheek and another on right leg. Slight cough. Crepitations bases of lungs.

1-3-33: Temperature 103.4°.

2-3-33: Temperature down, on evening of 1-3-33:
Up again on 2-3-33.

3-3-33: Temperature up to 100°.

5 ccs. of anti-streptococcal serum given.

Weight - 13 lbs 7 ozs.

5-3-33: Further 5 ccs. of anti-streptococcal serum given.

6-3-33- 11-3-33: Temperature down to normal.

8-3-33: Pulse rate rapid - rhythm tic tac.

Digitalis zi in 24 hours given.

10-3-33:
Pulse steadier: slower. Left base definite patch with coarse crepitations - tubular breathing.

11-3-33: Child slightly better.

Further purpuric patches on forehead - still resents handling.

11-3-33: Temperature 100°.

Ears still discharging. Return of cough.

13-3-33: Temperature down to 98°. Left base tubular breathing: few crepitations.

Small excoriation on penis.

14-3-33: Temperature down.

Weight - 13 lbs.

21-3-33: Temperature 101.4°.

Weight - 13 lbs 3 ozs.

22-3-33: Temperature in evening 101.8°.

Fontanelle tense and bulging. Penis oedematous.

23-3-33:
Fontanelle bulging.

No strabismus. Kernig negative.

Knee jerks equal on both sides and brisk.

24-3-33:
Lumbar puncture - 45ccs. clear fluid withdrawn under great pressure.

24-3-33 - 28-3-33: Slight rise in temperature up to 100°.

28-3-33:
Abscess in neck re-discharging - increased and much greenish pus obtained.

29-3-33:
Abscess in neck healing: redness and swelling in right fold of buttock - appears to be pointing 1½" from anus.

Temperature fluctuates between 98 and 100.8° over period of days.

31-3-33:
Abscess near anus enlarging.

Incised - large quantity of greenish pus dischared with unpleasant ordour. Cavity padded with ribbon gauze.

2-4-33:
Weight - 13 lbs. 1 oz.

Slight rise of temperature.

4-4-33:
Temperature - 101°.

Left base dull. Few crepitations.

Skin yellow - waxy. No jaundice. Sclerae bluish.

No nasal secretion; aural discharge dry.

7-4-33:
Weight - 13 lbs. 4 ozs.

Chest: no physical signs.

Abdomen distended: no splenic enlargement.

Stools yellow, but relaxed.

8-4-33: Gaining weight. Taking food well.

10-4-33: Weight - 13 lbs. 11 ozs.

Temperature - 102°.

Large cervical glands posterior triangle of neck left side.

Tonsils: large - red. No exudate.

Buttocks: abscess - dry - healing.

12-4-33: Temperature - 102°.

Weight dropping. Child pale: anaemic. No splenic enlargement. Put on mist Ferri et Ammon.cit. zi.t.i.d. (6 grs. per day).

Haemoglobin - 48%

13-4-33 - 18-4-33: Steady loss of weight to 12 lbs. 15 ozs.

18-4-33: Weight: 12 lbs. 13 ozs.

Temperature - 103°. Dullness left base.

Few crepitations.

22-4-33:
Iron increased to 8 grs. per day.

From 22-4-33 steady rise in weight.

24-4-33:
Weight: 13 lbs.

Steady improvement except for slight exacerbations of temperature. Appetite good - and general condition good.

25-4-33:
Ears discharging. Cough still persistent.

Haemoglobin - 46%.

26-4-33: 2 relaxed stools.

Examination of Blood:

Haemoglobin 46%

Red Blood Corpuscles: 3,580,000 per cmm.

Colour Index .6

White Blood Corpuscles: 8,740 per cmm.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 2.5% | Total 28.5% |
| Band forms | 17 % | |
| Segmental forms | 9 % | |
| Lymphocytes | 54% | |
| Monocytes | 14.5% | |
| Eosinophiles | 2 % | |
| Basophiles | .5% | |

Red cells very poorly filled: some of the cells completely empty. Few show poikilocytosis.

Numerous blood platelets seen.

Iron increased to 12 grs. per day.

28-4-33 - 29-4-33: 3 normal stools in 24 hours.

30-4-33: 2 normal stools in 24 hours.

Temperature - normal.

Cough still present.

1-5-33: Weight: 13 lbs. 11 ozs.

Urine: microscopically no pus, albumen, or sugar.

Slight rise in temperature to 99.8°.

Examination of Blood:

Haemoglobin 46%

Red Blood Corpuscles: 3,750,000 per cmm.

Colour Index .6

White Blood Corpuscles: 12,300 per cmm.

Reticulocytes 8%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 5% | Total 35% |
| Band forms | 23% | |
| Segmental forms | 7% | |
| Lymphocytes | 45% | |
| Monocytes | 14% | |
| Eosinophiles | 2% | |
| Basophiles | 1% | |

Red cells very poorly filled - some completely empty. No nucleated red cells or megaloblasts seen. Numerous platelets.

Coincident with these factors, there is a steady improvement in general condition. Small increase in weight. Appetite has become good.

4-5-33:

Iron increased to 15 grs. per day.

Weight : 13 lbs. 6 ozs.

5-5-33:

Differential Blood Count:

| | | |
|---|---|---|
| Myelocytes | 2.5% | Total 23.5% |
| Metamyelocytes | 5 % | |
| Band forms | 14.5% | |
| Segmental forms | 1.5% | |
| Lymphocytes | 53.5% | |
| Monocytes | 15.5% | |
| Eosinophiles | 6.5% | Total 9.5% |
| Preeosinophiles myelocytes | 3.0% | |

Red cells very poorly filled in a great number of cases. Some completely empty.

6-5-33:

Urine: microscopically no pus, albumen or sugar.

8-5-33: Gaining weight: 13 lbs. 13 ozs. Taking food well and generally improving.

Examination of Blood:

Haemoglobin 50%

Red Blood Corpuscles: 4,300,000 per cmm.

Colour Index .6

White Blood Corpuscles: 11,250 per cmm.

Reticulocytes 6.5%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 2.5% | Total 36.5% |
| Band forms | 29 % | |
| Segmental forms | 5 % | |
| Lymphocytes | 37.5% | |
| Monocytes | 19 % | |
| Eosinophiles | 3% | Total 6.5% |
| Preeosinophiles myelocytes | 3.5% | |

Red cells poorly filled in a number of cases.

11-5-33:
3 stools - relaxed . Grey in colour due to iron.

15-5-33:
Iron increased to 20 grs. per day.

Examination of Blood:

Haemoglobin 53%

Red Blood Corpuscles: 4,450,000 per cmm.

Colour Index .6

White Blood Corpuscles: 12.500 per cmm.

Reticulocytes .7%

Differential Count:

| | | |
|---|---|---|
| Metamyclocytes | 1.5% | Total 32% |
| Band forms | 26 % | |
| Segmental forms | 4.5% | |
| Lymphocytes | 41.5% | |
| Monocytes | 13 % | |
| Eosinophiles | 10 % | Total 11% |
| Preeosinphiles myelocytes | 1 % | |

16-6-33:
Owing to diphtheria contact nasal and throat swabs were taken.

Bacteriological report on Nasal Swab: Few organisms morphologically resembling diphtheria.

To have a virulence test and for observation transferred to Walkergate Fever Hospital.

31-5-33:
Returned from Walkergate. Cough marked.

Complexion brown - due to tinging by sun.

Loss of weight to extent of 2 ozs.

Present weight: 13 lbs. 10 ozs.

1-6-33:
On Examination:

Muscles hypotonic, marked loss of subcutaneous tissue especially in region of groins, thighs and abdomen.

Cough marked.

Upper central incisor erupting.

No skin sepsis: no aural discharge. No glandular enlargement in neck.

Chest: No percussion dullness. Breath sounds harsh, vesicular and numerous accompanying rhonchi.

Abdomen flaccid: no splenic or hepatic enlargement.

Urine: Microscopically - no pus, Albumen or Sugar.

Iron increased to 30 grs. per day.

2-6-33:

Temperature 101°.

Cough. Mantoux negative. Upper central incisor erupting through gum.

Examination of Blood:

Haemoglobin 55%

Red Blood Corpuscles: 4,000,000 per cmm.

Colour Index .6

White Blood Corpuscles: 12,000 per cmm.

Reticulocytes 2%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 10.5% | |
| Band forms | 47 % | Total 62% |
| Segmental forms | 4.8% | |
| Lymphocytes | 32% | |
| Monocytes | 4% | |
| Eosinophiles | 2% | |
| Basophiles | 0% | |

Red cells show marked hypochromia.

6-6-33 - 7-6-33: Temperature 100°. Repeat of Mantoux - test negative.

Examination of Blood:

Haemoglobin 55%

Red Blood Corpuscles: 4,200,000 per cmm.

Colour Index .6

White Blood Corpuscles: 12,000 per cmm.

Reticulocytes 3%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 2% | Total 43% |
| Band forms | 38% | |
| Segmental forms | 3% | |
| Lymphocytes | 55% | |
| Monocytes | 3.5% | |
| Eosinophiles | 2.5% | |
| Basophiles | 0% | |

Red cells show marked hypochromia.

8-6-33:
Gastric lavage of 7-6-33.

Bacteriological report: No tubercle bacilli were found. There were a number of streptococci, some epithelial cells and one or two pus cells.

Urine: microscopically - no pus, no Albumen and no Sugar.

Weight: 13 lbs. 9 ozs.

Examination of Chest: Marked cough. No dullness on percussion. Breath sounds obscured by sililant rhonchi and crepitations: adventitious sounds were more marked on right side than on left side, especially at base.

Abdomen distended - no splenic enlargement.

Stools - 1 per day - relaxed.

11-6-33:
Weight steady at 13 lbs. 11 ozs.

Urine: microscopically - no pus, albumen or Sugar.

13-6-33:
Temperature - 101.6°

14-6-33: Examination of Blood:

Haemoglobin 55%

Red Blood Corpuscles: 4,100,000 per cmm.

Colour Index .6

White Blood Corpuscles: 10,000 per cmm.

Reticulocytes 1%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 7% | Total 49% |
| Band forms | 39% | |
| Segmental forms | 3% | |
| Lymphocytes | 47% | |
| Monocytes | 2% | |
| Eosinophiles | 3% | |
| Basophiles | .5% | |

Red cells show marked hypochromia.

16-6-33:

Urine: Microscopically no pus, Albumen or Sugar.

2 relaxed, grey stools.

Temperature fluctuating with little rises.

Weight going up steadily.

Chest: Crepitations accompanying vesicular, breathing.

Breath sounds - less marked at right base.

17-6-33: 1 relaxed, grey stool.

18-6-33: 1 relaxed, grey stool.

19-6-33: 2 relaxed, grey stools.

20-6-33: 2 relaxed, grey stools.

Urine: microscopically: No pus, Albumen or Sugar.

Weight: 14 lbs. 6 ozs.

21-6-33:
2 relaxed, grey stools.

Weight: 14 lbs. 6 ozs.

22-6-33: Examination of Blood:

Haemoglobin 60%

Red Blood Corpuscles: 4,500,000 per cmm.

Colour Index .6

White Blood Corpuscles: 8,000 per cmm.

Reticulocytes 3%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 4.5% | ) |
| Band forms | 24.5% | ) Total 30.5% |
| Segmental forms | 1.5%. | ) |
| Lymphocytes | 68.5% | |
| Monocytes | 1. % | |
| Eosinophiles | .5% | |

Hypochromia not very marked in red cells.

Slight cough.

2 relaxed, grey stools.

23-6-33:
Urine: microscopically - clear.
No Albumen. No Sugar or pus.

24-6-33: 3 relaxed, grey stools.

25-6-33: 1 relaxed, grey stool.

26-6-33: Slight discharge from both eyes - thin, yellow discharge. Urine: Microscopically no pus, Albumen or Sugar.

27-6-33. 2 grey, relaxed stools.

Slight temperature 100.2°.

28-6-33: 2 grey, relaxed stools.

29-6-33: Examination of Blood:

Haemoglobin 62%

Red Blood Corpuscles: 4,200,000 per cmm.

Colour Index ,7

White Blood Corpuscles: 9,100 per cmm.

Reticulocytes 2%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 3.5% | Total 41.5% |
| Band forms | 34 % | |
| Segmental forms | 4 % | |
| Lymphocytes | 55.5% | |
| Monocytes | 1.5% | |
| Eosinophiles | 1% | |
| Basophiles | .5% | |

Red cells show marked hypochromia in parts.

Urine: microscopically - clear. No pus, Albumen, or Sugar.

30-6-33: 1 grey, relaxed stool. Weight steadily increasing.

1-7-33: 1 normal stool. Weight steadily increasing.

2-7-33: Urine: microscopically - no pus, Albumen or Sugar. 1 normal stool. Weight steadily increasing.

3-7-33: 1 normal stool. Weight steadily increasing.

4-7-33: 4 relaxed, grey stools. Weight steadily increasing.

5-7-33: 1 normal stool. Weight steadily increasing. Slight rise in temperature.

6-7-33: Urine: microscopically - no pus, Albumen or sugar.

7-7-33: Examination of Blood:

Haemoglobin 68%

Red Blood Corpuscles: 4,500,000 per cmm.

Colour Index ,7

White Blood Corpuscles: 11,000 per cmm.

Reticulocytes present, but do not constitute any appreciable percentage.

Weight steadily increasing.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 1% | Total 48% |
| Band forms | 45% | |
| Segmental forms | 2% | |
| Lymphocytes | 46% | |
| Monocytes | 2.5% | |
| Eosinophiles | 3.5% | |

Weight: 15 lbs.

8-7-33: No stool in past 24 hours.

9-7-33: Ears still discharging.

2 normal stools. Urine: microscopically - no pus, Albumen or Sugar.

10-7-33: 1 Normal stool.

11-7-33: 1 normal stool.

13-7-33: Examination of Blood:

Haemoglobin 68%

Red Blood Corpuscles: 4,100,000 per cmm.

Colour Index .8

White Blood Corpuscles: 10,300 per cmm.

Reticulocytes .5%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 1.5% | Total 33.5% |
| Band forms | 30.5% | |
| Segmental forms | 1.5% | |
| Lymphocytes | 54% | |
| Monocytes | 5% | |
| Eosinophiles | 7% | |

Red cells do not show very much hypochromia - some are well filled in parts - other areas the cells are poorly filled.

14-7-33:
Stools normal.

Weight: 15 lbs. 6 ozs.

Cough quite marked.

15-7-33:
Cough still marked. No physical signs in chest.

16-7-33 - 17-7-33 - 18-7-33:
Ears quite dry now.

Stools normal. Appetite good. General condition very good.

19-7-33: Weight: 15 lbs. 9 ozs.

20-7-33:
3 relaxed stools.

21-7-33: Examination of Blood:

Haemoglobin 68%

Red Blood Corpuscles: 3,900,000 per cmm.

Colour Index .8

White Blood Corpuscles: 9,700 per cmm.

Reticulocytes - too few to be recorded as a percentage.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 6% | |
| Band forms | 29% | Total 40.5% |
| Segmental forms | 5.5% | |
| Lymphocytes | 55.5% | |
| Monocytes | 3 % | |
| Eosinophiles | 1 % | |

The red cells are poorly filled, and show marked hypochromia.

22-7-33 - 23-7-33:
Weight still maintained.

Child is bright and playful.

Cough only slightly present.

24-7-33 - 25-7-33: Weight: 15 lbs. 14 ozs.

27-7-33: Examination of Blood:

Haemoglobin 69%

Red Blood Corpuscles: 4,000,000 per cmm.

Colour Index .8

White Blood Corpuscles: 7,000 per cmm.

Reticulocytes .5%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 1% | Total 41.5% |
| Band forms | 36.5% | |
| Segmental forms | 4 % | |
| Lymphocytes | 53% | |
| Monocytes | 3.5% | |
| Eosinophiles | 2.5% | |

Child is cutting 2 upper lateral incisors.

Stools 1 per day - normal. Grey in colour due to iron.

Child is looking extremely fit.

28-7-33: Stools - 1 per day, normal. Cough has been present all along. Occasional crepitations in chest: nil else on examination.

29-7-33: Weight: 15 lbs. 14 ozs.

30-7-33: Stools - 2 per day, 1 relaxed.

31-7-33: Stools, 2 per day. Cough has been present all along. Occasional crepitations in chest: nil else on examination.

Photograph of Frank H. on the 18-8-33.

Weight 16 lbs. 3 ozs. and clinical condition very good.

To face Case III p.21.

Examination of Blood:

Haemoglobin 70%

Red Blood Corpuscles: 4,500,000 per cmm.

Colour Index .7

White Blood Corpuscles: 7,800 per cmm.

Occasional Reticulocytes seen.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 2% | Total 24% |
| Band forms | 19% | |
| Segmental forms | 3% | |
| Lymphocytes | 75 % | |
| Monocytes | 1.5% | |
| Eosinophiles | 1% | |

Red cells show little hypochromia compared with previous slides.

The progress in this child is very well maintained.

on 18-8-33: Weight: 16 lbs. 3 ozs.

on 1-9-33: Weight: 17 lbs. 4 ozs.

## SUMMARY of CASE III.

This case represents the findings of an older child.

A definite history of puerperal sepsis in the mother was obtained here. At 7 months disturbance of health commenced - followed later by a long illness during which one septic manifestation succeeded the other. This septic process consisted of otorrhoea, interstitial pneumonia, abscess formation in various parts of the body, and discharging eyes.

The blood showed a microcytic hypochromic anæmia, very low Haemoglobin, low colour index and marked hypochromia of the red blood corpuscles.

Blood Charts are appended here.

Name: Frank H.

## WEEKLY BLOOD COUNTS.

| Date | Haemoglobin % | Red Blood Corpuscles. per cmm. | Colour Index. | White Blood Corpuscles per cmm. | Reticulocytes. % |
|---|---|---|---|---|---|
| 26-4-33 | 46 | 3,580,000 | .6 | 8.740 | - |
| 1-5-33 | 46 | 3,750,000 | .6 | 12,300 | 8 |
| 8-5-33 | 50 | 4,300,000 | .6 | 11,250 | 6.5 |
| 15-5-33 | 53 | 4,450,000 | .6 | 12,500 | .7 |
| 2-6-33 | 55 | 4,000,000 | .6 | 12,000 | 2.0 |
| 7-6-33 | 55 | 4,200,000 | .6 | 12,000 | 3.0 |
| 14-6-33 | 55 | 4,100,000 | .6 | 10,000 | 1,0 |
| 22-6-33 | 60 | 4,500,000 | .6 | 8,000 | 3.0 |
| 29-6-33 | 62 | 4.200,000 | .7 | 9,100 | 2.0 |
| 7-7-33 | 68 | 4,500,000 | .7 | 11,000 | 0 |
| 13-7-33 | 68 | 4,100,000 | .8 | 10,300 | .5 |
| 21-7-33 | 68 | 3,900,000 | .8 | 9,700 | -occasional ret. seen. |
| 27-7-33 | 69 | 4,000,000 | .8 | 7,000 | .5 |
| 31-7-33 | 70 | 4,500,000 | .7 | 7,800 | occasional ret. seen. |

CHART 3b.

Name: Frank H.

DIFFERENTIAL COUNTS. Haemogram (Schilling)

Leishman's Stain.

| Date | Total White Count. | Myelocytes % | Metamyelocytes % | Band forms % | Segmental forms. % | Total % |
|---|---|---|---|---|---|---|
| | | | Neutrophile Leucocytes. | | | |
| 26-4-33 | 8,740 | - | 2.5 | 17 | 9 | 28.5 |
| 1-5-33 | 12,300 | - | 5 | 23 | 7 | 35.0 |
| 5-5-33 | | 2.5 | 5 | 14.5 | 1.5 | 23.5 |
| 8-5-33 | 11,250 | - | 2.5 | 29 | 5 | 36.5 |
| 15-5-33 | 12,500 | - | 1.5 | 26 | 4.5 | 32.0 |
| 2-6-33 | 12,000 | - | 10.5 | 47 | 4.5 | 62.0 |
| 7-6-33 | 12,000 | - | 2 | 38 | 3 | 43.0 |
| 14-6-33 | 10,000 | - | 7 | 39 | 3 | 49.0 |
| 22-6-33 | 8,000 | - | 4.5 | 24.5 | 1.5 | 30.5 |
| 29-6-33 | 9,100 | - | 3.5 | 34 | 4 | 41.5 |
| 7-7-33 | 11,000 | - | 1 | 45 | 2 | 48.0 |
| 13-7-33 | 10,300 | - | 1.5 | 30.5 | 1.5 | 33.5 |
| 21-7-33 | 9,700 | - | 6 | 29 | 5.5 | 40.5 |
| 27-7-33 | 7,000 | - | 1.0 | 36.5 | 4 | 41.5 |
| 31-7-33 | 7,800 | - | 2 | 19 | 3 | 24.0 |

CHART 3b. continued.

Name: Frank H.

| Date | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles % |
|---|---|---|---|---|
| 26-4-33 | 54 | 14.5 | 2 | .5 |
| 1-5-33 | 45 | 14 | 2 | 1 |
| 5-5-33 | 53.5 | 15.5 | 9.5 | 0 |
| 8-5-33 | 37.5 | 19 | 6.5 | 0 |
| 15-5-33 | 41.5 | 13 | 11 | 0 |
| 2-6-33 | 32 | 4 | 2 | 0 |
| 7-6-33 | 55 | 3.5 | 2.5 | 0 |
| 14-6-33 | 47 | 2 | 3 | .5 |
| 21-6-33 | 68.5 | 1 | .5 | 0 |
| 29-6-33 | 55.5 | 1.5 | 1 | .5 |
| 7-7-33 | 46 | 2.5 | 3.5 | 0 |
| 13-7-33 | 54.0 | 5 | 7 | 0 |
| 21-7-33 | 55.5 | 3 | 1 | 0 |
| 27-7-33 | 53 | 3.5 | 2.5 | 0 |
| 31-7-33 | 75 | 1.5 | 1 | 0 |

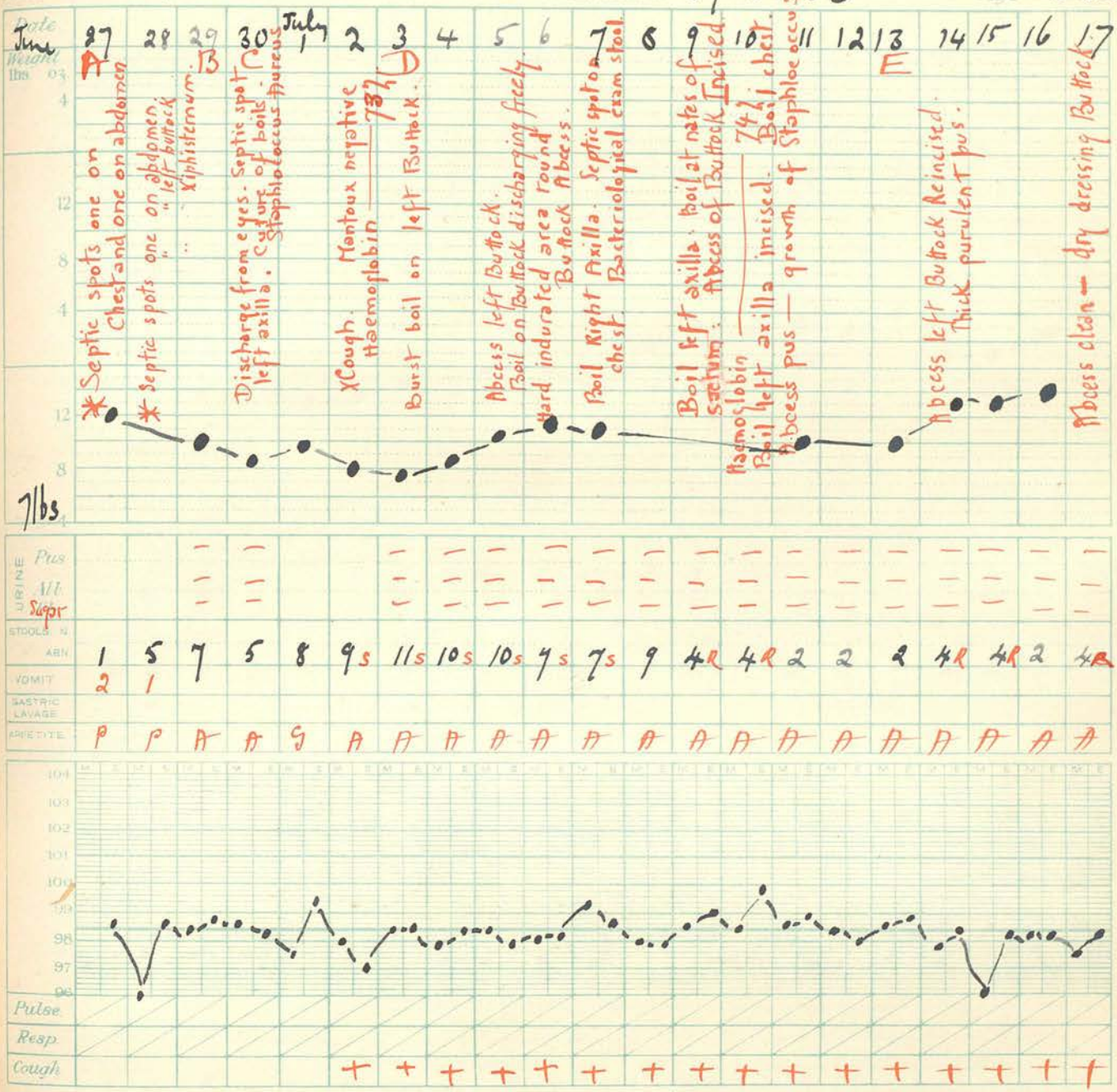
## C A S E  IV.

CHARTS 4a. & 4 b.& 4c.

Chart 4e. Page 1.

THE BABIES' HOSPITAL NEWCASTLE

Name Ronald K. Date of Admission 27.6.33 Age 6 weeks.




NOTES ON FEEDING

27.6.33. Feed A. Expressed Breastmilk with complementary feeds: No 2. 7½ — 2 ozs.

29.6.33. B. Weak tea ℥iii 3hrly for 24 hrs.

30.6.33. C. Skimmed Cow + gate — 2 ozs. (10 feeds)

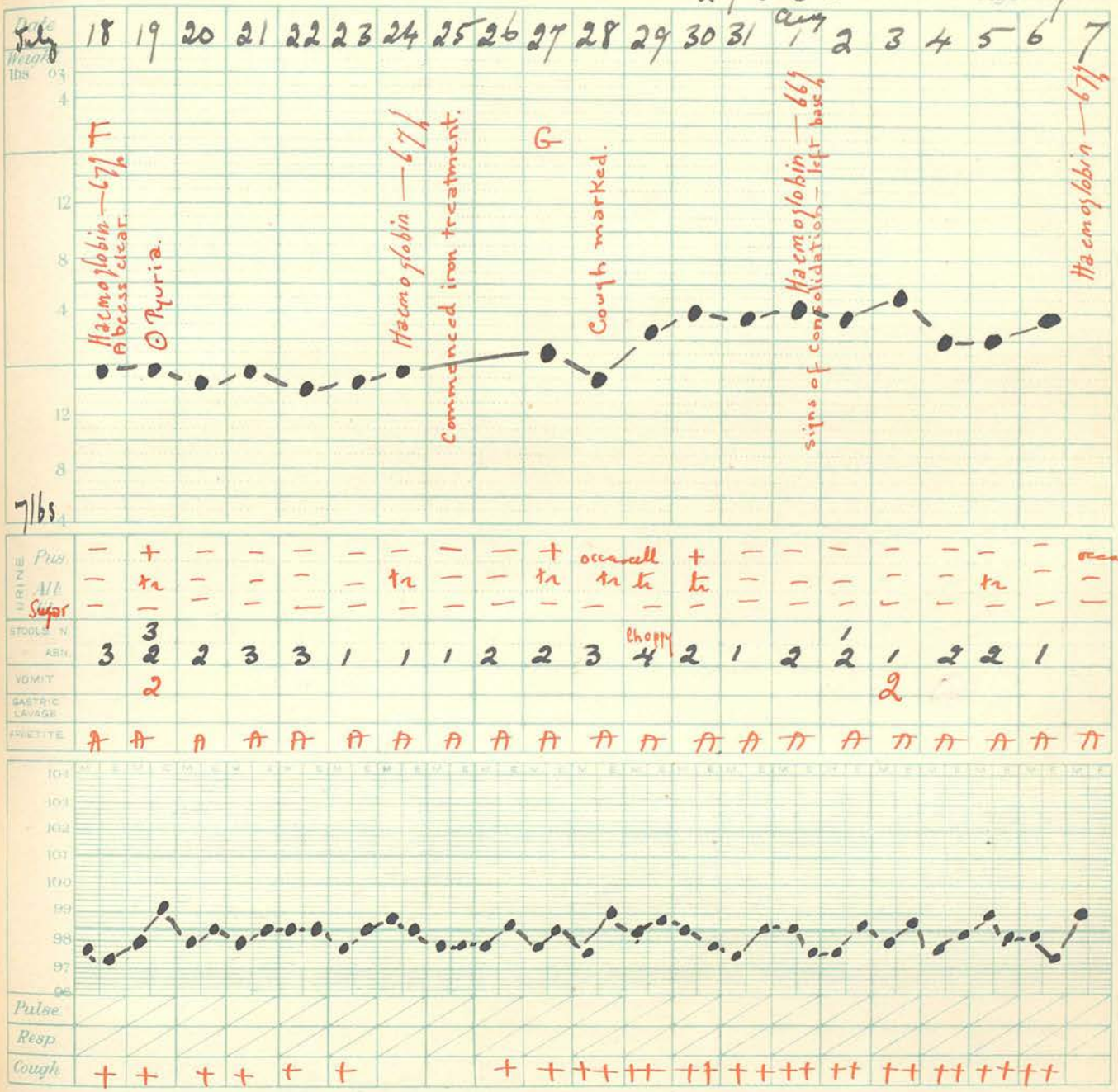
3.7.33. D. No 2: 7½ 2 ozs c Lactic Acid. Saline with glucose in between feeds.

13.7.33. E. No 3. 7½ 2 8 ozs with Lactic Acid.

TREATMENT

THE BABIES' HOSPITAL NEWCASTLE

Name Ronald K. Date of Admission 27.6.33. Age 9 weeks.




Notes on Feeding

18·7·33 F. No 3 7½ } 28 ozs ē lactic acid. 7 feeds.

27·7·33 G No 4 7½ } 28 ozs.: 7 feeds

Treatment

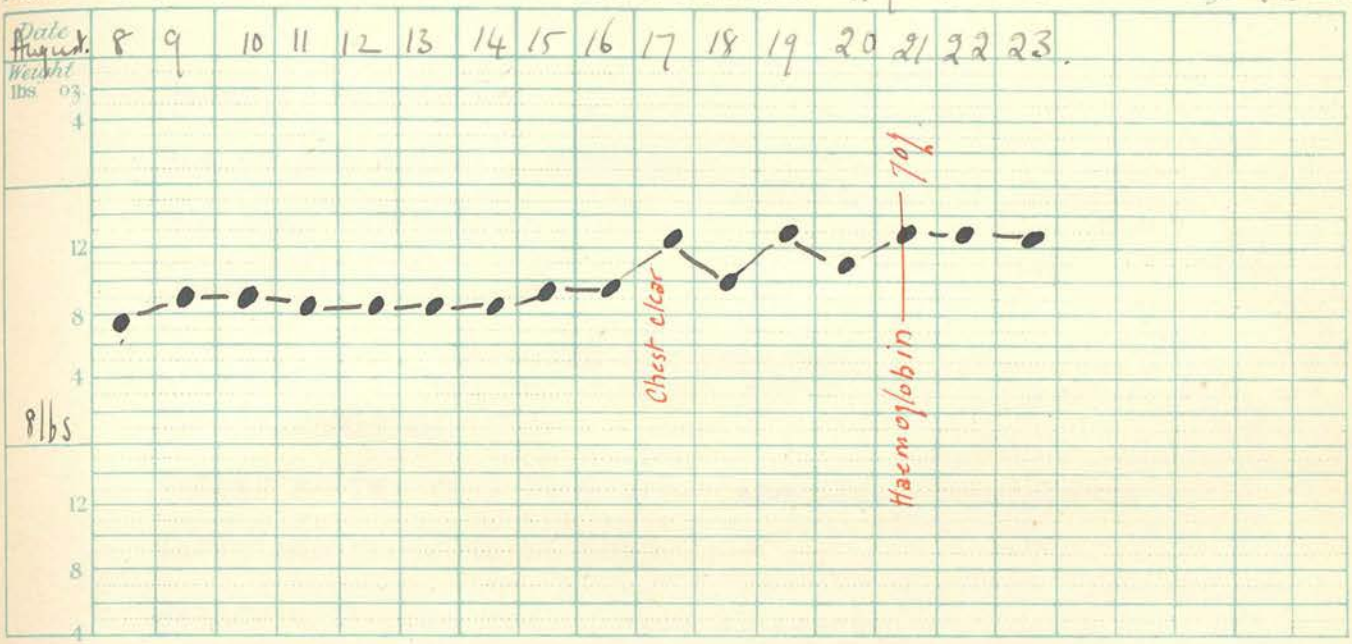
25·7·33.

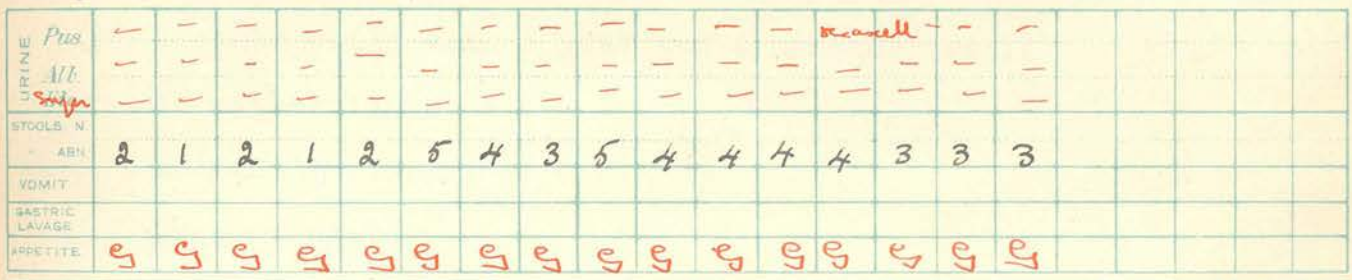
℞. Mist Ferri et amm.cit. zi t.i.d. (9iii per dose)
6 grs per day.

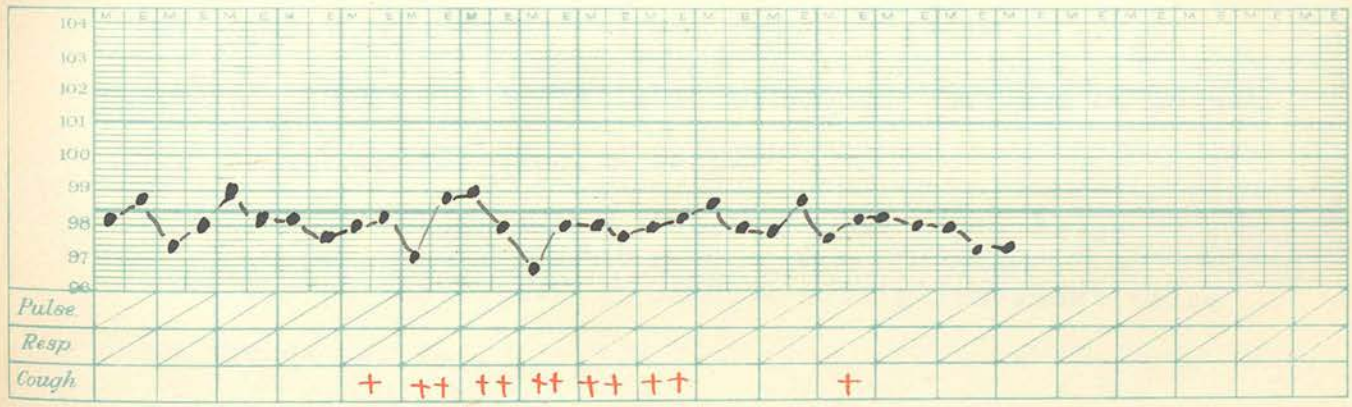
1·8·33. Mist Ferri et amm.cit zii b.d.
ziss once daily.
11 grs per day.

# THE BABIES' HOSPITAL NEWCASTLE

Name Ronald K. Date of Admission 27.6.33 Age 12 weeks.




NOTES ON FEEDING

Feed 6 → No 4 – 7½ % – 28 ozs. & Sister Laura's food.

TREATMENT

# C A S E IV.

Name: Ronald K.

Age on Admission: 6 weeks.

Admitted: 27-6-33.

Reason for Admission:

I. Hare lip for repair.

Family History:

Mother alive: aged 21 years. anæmic. Haemoglobin taken and found to be 30%.

Father alive and well: aged 21 years.

1 other child aged 1 year and 4 months: well.

No miscarriages.

No family history of T.B.

Present History:

2nd baby: full time: normal labour: quite an easy labour. Baby was not weighed at birth: Weighed on 10th day approximately 7lbs. 8 ozs.

Breast fed Grade A milk until 5 weeks old - never entirely on the breast. Grade A milk given about twice or thrice per day.

Baby cried soon after birth, was not cyanosed. Puerperium normal. Mother has been anæmic for some time before birth of child and is at present being treated with Iron and Liver.

The cord separated off on 5th day - umbilicus has been quite clean.

When 2 weeks old Mother noticed occasional blotches on

baby's skin. These appeared early and passed off quite as readily.

When 5 weeks old on 23-6-33 Mother noticed a septic spot near umbilicus, but did not observe any other spots. After 25-6-33 baby gradually began to be ill: no vomiting. Diarrhoea commenced. Motions 5-6 per day, yellow green in colour - mucus in them and no blood. Buttocks became very red and angry looking.

Despite this Mother, who is a fair witness - thinks baby has not lost weight.

Sleeps well and takes food by spoon.

There has been no aural discharge at any time.

Father unemployed: live in 1 back room, which is fairly light.

Mother was confined at home.

Weekly income 27/3 per week.

Examination on 27-6-33.

A small, quite well developed infant weighing 7 lbs 12 ozs. Aged 6 weeks. With very marked hare lip and cleft palate deformity.

Circumference of head - 14".

Length - 19", heel to occiput.

Anterior Fontanelle admits 2 finger tips.

Tonsils clear. There is no aural discharge or nasal discharge. No enlarged glands in cervical, axillary regions or in groins.

Skin Sepsis: Remains of septic spot on left scapula, few areas on back, definite septic spot on inner surface of left upper arm and one on left side of abdomen about 1" away from umbilicus.
The spots are red: raised in centre with a yellow pointing central area.
The umbilicus is clear - small umbilical hernia present.
Buttocks - extremely red and angry looking.
Chest: Lungs: No percussion dullness.
Good air entry and no accompaniments.
Heart: Resting rate 175 per minute.
No murmurs, sounds closed and pure in all areas.
Abdomen: not distended. The spleen is not palable and there is no hepatic enlargement.
27-6-33: 1 stool - green, offensive with mucus.
Baby has vomited twice. Fed on expressed breast milk with complementary feeds - 21 ozs. by spoon.
28-6-33: 5 stools in 24 hours. Very small, greenish, with mucus and a trace of blood.
1 vomit during day.
Appetite poor.
1 septic spot on abdominal wall just below costal margin and in line with the left nipple.
Another septic spot on left buttock.
A small septic spot under Xiphisternum.

29-6-33: Urine: clear - no pus, Albumen or Sugar.

7 green stools with mucus.

Food withheld and weak tea - 3 ozs. 3 hourly- given for 24 hours.

30-6-33: Eyes are discharging slightly.

Urine: clear. No pus, Albumen or Sugar.

5 stools - green, very small. undigested.

Septic spot in left axilla.

Skimmed Cow & Gate milk given - 21 ozs. 10 feeds.

Weight down to 7 lbs. 8 ozs. Baby is taking feeds fairly well.

1-7-33. Pus from boils sent for Bacteriological examination on 30-6-33. Result: Direct films: few degenerated pus cells and some Gram positive cocci - probably staphylococci present. No acid-fast organisms (T.B.) seen.

Cultures - staphylococcus aureus isolated.

8 stools, green with mucus. No blood.

The stools are very small.

Discharge from eyes very slight.

Slight rise in temperature - 99.4°.

2-7-33:

9 stools in 24 hours - green with fair quantity of mucus. No blood and very small in bulk.

Cough has commenced.

Physical examination of Chest: Respiration rapid. Few rhonchi in chest. Mantoux test negative. No fresh septic spots.

Examination of Blood:

Haemoglobin 73%

Red Blood Corpuscles: 3,750,000 per cmm.

Colour Index .9

White Blood Corpuscles: 10,900 per cmm.

Reticulocytes 1%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 13% | Total 33% |
| Band forms | 20% | |
| Segmental forms | 0% | |
| Lymphocytes | 65% | |
| Monocytes | 2% | |
| Eosinophiles | 1.5% | |

Red cells show hypochromia.

3-7-33: Urine : Clear - no pus microscopically.
No albumen or Sugar.

11 very small stools - green with a great deal of mucus in them and no blood.

Baby is taking feeds well and is having 21 ozs of milk and water mixture with lactic acid added. This is given by spoon on account of the cleft palate and hare lip and baby being unable to suck properly.

Saline with glucose is given in between feeds.

Boil on left buttock which has burst and much pus has exuded during night.

4-7-33: Urine: clear.

10 small green stools with mucus.

Baby is breathing more easily,

There are no further septic spots.

Weight 7 lbs 9 ozs.

5-7-33:

Urine - clear.

10 very small stools, green with much mucus.

Abscess on left buttock region. Boil on buttock discharging freely.

6-7-33:

Slight rise in temperature - 99.4° - probably due to abscess,formation.

Abscess on left buttock region - hard - red - indurated - circumscribed area about the size of a florin: this is situated near the boil which appeared on 3-7-33.

Cough less and respiration much easier.

Stools - 7 in number . Character yellowish green, with little mucus. Very small stools.

Urine; nil.

7-7-33: Abscess on buttock is coming to a head though there is still a very hard circumscribed area round about it. Boil in right axilla. Septic spot on the chest.

Cough very slight.

Buttocks angry and red.

7 small green stools with mucus.

Urine - nil

Bacteriological Examination of Stools: No Bacillus dysenteriae: B. Morgan No 1 present.

8-7-33:

Urine - clear.

9 small stools - green with mucus.

9-7-33:

Fresh crop of septic spots. Boil in left axilla. Boil at nates of sacrum, which is still hard and mattering near centre. The abscess on buttock incised and is discharging freely. Baby cries a good deal and appears to have a small hydrocoele.

Stools - 4 in number. Improving - yellow and relaxed.

10-7-33:

Slight rise in temperature to 100°.

4 yellow relaxed stools.

Boil on chest opened. Boil left axilla incised. Abscess on buttock is draining slightly. Hard and indurated round about and looks as if new abscess is forming.

Blood Examination:

Haemoglobin 74%

Red Blood Corpuscles: 3,800,000 per cmm.

Colour Index .9

White Blood Corpuscles: 11,080 per cmm.

Reticulocytes 2%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 4.5% | Total 36.5% |
| Band forms | 30 % | |
| Segmental forms | 2 % | |

Lymphocytes 57%

Monocytes 2.5%

Eosinophiles 3%

10-7-33:

Bacteriological report of pus from abscess on left buttock: Direct films. Numerous Gram positive cocci present. No Gram negative organisms seen. No acid-fast organisms (T.B.) seen.

Cultures: Staphylococcus aureus isolated. No B. coli found.

11-7-33:

Abscess on left buttock draining.

Urine - clear.

2 yellow relaxed stools.

12-7-33:

2 yellow relaxed stools.

Boil at nates of sacrum, healed.

13-7-33:

Feed increased to 28 ozs. lactic acid.

2 yellow relaxed stools.

Urine - clear.

14-7-33:

4 yellow relaxed stools.

Urine - clear and microscopically no pus cells found during the recent examinations

Weight going up to 7 lbs. 13 ozs.

Abscess left buttock pointing and incised.

About 3-4 ccs. of thick purulent pus drained away.

General condition is improving and cough is slight.

15-7-33:
Urine - clear. Microscopically no pus.

4 yellow relaxed stools.

Sinus forceps inserted into abscess area in buttock, and pus evacuated.

16-7-33:
Weight going up. Marked improvement in general condition.

Lactic acid only 30 drops to 28 ozs. of food now.

No other septic areas.

Stools - 2 in number - yellow relaxed.

17-7-33:
Abscess clear. Dry dressing.

4 yellow relaxed stools.

Urine - clear.

18-7-33:
Complexion of baby very pale.

Examination of Blood:

Haemoglobin 67%

Red Blood Corpuscles: 3,250,000 per cmm.

Colour Index 1

White Blood Corpuscles: 7,000 per cmm.

Reticulocytes 1%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 2% | |
| Band forms | 29% | Total 31.5% |
| Segmental forms | .5% | |
| Lymphocytes | 62% | |
| Monocytes | 5% | |
| Eosinophiles | 1% | |

18-7-33:
Abscess clear. Dry dressing.

Feed 28 ozs. 3 parts milk, 2 water: 7 feeds.

30 drops of lactic acid.

Attempting to suck by bottle.

Bowels - 3 motions in 24 hours. 1 constipated one.

Complexion very pale.

19-7-33:
Urine - microscopically pus present in fair amount.
Trace of Albumen.
No Sugar.

Slight rise in temperature to 99°.

Cough still present. 2 vomits.

Weight: 7 lbs. 15 ozs.

Stools - 5 in 24 hours. 2 relaxed.

20-7-33 - 24-7-33:
Urine - clear. Microscopically no pus.

Cough absent on 24-7-33.

Weight maintained.

24-7-33: Examination of Blood:

Haemoglobin 67%

Red Blood Corpuscles: 3,750,00 per cmm.

Colour Index .8

White Blood Corpuscles: 7,000 per cmm.

Reticulocytes .5%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 1% | Total 41.5% |
| Band forms | 36% | |
| Segmentalforms | 4.5% | |
| Lymphocytes | 52% | |
| Monocytes | 2% | |
| Eosinophiles | 4% | |

Red cells show a degree of hypochromia.

No fresh skin sepsis.

25-7-33:

Complexion very pale. Iron treatment commenced.

27-7-33:

Feeds increased in strength. No 4 given. 4 parts milk and 2 parts water. Lactic acid gradually cut down until the feeds are free from it.

Urine - microscopically pus present in fair amount.

Trace of Albumen.

No Sugar.

28-7-33:

Cough more pronounced than before.

No physical signs in the chest.

Urine - occasionally pus cells.

Trace of Albumen.

29-7-33:

4 relaxed stools. "choppy", (with mucus in them).

30-7-33: - 31-7-33:

Weight is going up. 8 lbs. 3 ozs. on 30-7-33.

8 lbs. 4 ozs. on 31-7-33.

30-7-33:

Urine - microscopically pus in fair amount.

Trace of Albumen.

No sugar.

1-8-33:

Child has marked cough. Is pale looking.

Signs of consolidation on left side.

No alteration in percussion note.

Breathing: Tubular breathing on left base and a few accompanying crepitations.

Examination of Blood:

Haemoglobin 66%

Red Blood Corpuscles: 3,700,000 per cmm.

Colour Index .8

White Blood Corpuscles: 7,000 per cmm.

Reticulocytes 2%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 9% | Total 26% |
| Band forms | 16% | |
| Segmental forms | 1% | |
| Lymphocytes | 67% | |
| Monocytes | 5% | |
| Eosinophiles | 1% | |

3-8-33:

Cough still marked. Baby has had 2 large vomits.

Stools - almost normal.

There is no temperature. No evidence of fresh sepsis.

The mouth is clean and weight is fairly constant except

for an occasional loss of one or two ozs.

4-8-33 - 6-8-33:

Cough present.

Urine - clear, except for occasional trace of albumen.

7-8-33:

Urine - Microscopically occasional pus cells.

No albumen or sugar.

Slight rise in temperature to 99°.

Chest appears to be clearing up.

Examination of Blood:

Haemoglobin 67%

Red Blood Corpuscles: 3,500,000 per cmm.

Colour Index .9

White Blood Corpuscles: 12,000 per cmm.

Reticulocytes 1.5%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 1% | Total 48% |
| Band forms | 44% | |
| Segmental forms | 3% | |
| Lymphocytes | 50% | |
| Monocytes | 1% | |
| Eosinophiles | 3% | |

Chest condition improving.

8-8-33 - 11-8-33:

Urine - clear. Microscopically no pus.

Stools - 1-2 per day. Very slightly relaxed.

Appetite good. General condition very good and infant considerably improved.

12-8-33:
Cough has recommenced again. Left base dull on percussion. Breath sounds harsh, with occasional accompaniments.

13-8-33:
Cough a little pronounced.

Weight well maintained at 8 lbs. 9 ozs.

Motions - 5 per day - yellow relaxed.

Urine - clear.

14-8-33 - 15-8-33:
Motions increasing. 3 & 5 per day. relaxed .

Urine - clear.

Cough still present and chest improving.

17-8-33:
Weight going up - 8 lbs. 13 ozs.

Motons - 4 per day - relaxed.

Chest is clear, despite cough which still remains.

Urine - clear.

Temperature normal.

18-8-33 - 20-8-33:
Urine - clear -except for an occasional cell on the 20-8-33.

Stools-4 per day - yellow and relaxed.

No cough past few days.

21-8-33: Examination of Blood:

Haemoglobin 70%

Red Blood Corpuscles: 4,100,00 per cmm.

Colour Index .8

White Blood Corpuscles: 9,300 per cmm.

Occasional Reticulocytes seen.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 5% | Total 27% |
| Band forms | 17% | |
| Segmental forms | 5% | |
| Lymphocytes | 62% | |
| Monocytes | 3% | |
| Eosinophiles | 5% | Total 7% |
| Preeosinophiles myelocytes | 2% | |

Cough has returned again. Chestis, however, clear. There is no percussion dullness. Good air entry. Breathing vesicular and no accompaniments.

The general condition is good and the weight is well maintained.

22-8-33 - 23-8-33:

Urine- clear. Microscopically no pus.

Stools - 3 in 24 hours. Slightly relaxed - yellow in colour.

Appetite good. No cough.

Baby has been discharged in an excellent condition.

After convalescence hare lip is to be repaired.

## S U M M A R Y of C A S E IV.

This case particularly demonstrates numerous skin abscesses, which passed from one part of the body to another. The urine occasionally showed pus, but this was not of much importance in this case. Gastrointestinal symptoms were marked at the commencement, this parenteral affection showing itself as numerous green stools. Careful feeding, however, rectified this condition.

Respiratory complications in the form of pneumonia eventually began. This is not at all surprising too considering the infant's disability of hare lip and cleft palate. It is comforting to think that the mouth remained absolutely clean throughout the course of the illness, especially with cleft palate.

There was a good recovery and no recurrence of skin lesions.

No history of difficult labour or sepsis in Mother was obtained here.

CHART 4a.

Name: Ronald K.

## WEEKLY BLOOD COUNTS

| Date | Haemoglobin % | Red Blood Corpuscles per cmm. | Colour Index | White Blood Corpuscles per cmm. | Reticulocytes % |
|---|---|---|---|---|---|
| 2-7-33 | 73 | 3,750,000 | .9 | 10,900 | 1 |
| 10-7-33 | 74 | 3,800,000 | .9 | 11,080 | 2 |
| 18-7-33 | 67 | 3,250,000 | 1 | 7,000 | 1 |
| 24-7-33 | 67 | 3,750,000 | .8 | 7,000 | .5 |
| 1-8-33 | 66 | 3,700,000 | .8 | 7,000 | 2 |
| 7-8-33 | 67 | 3,500,000 | .9 | 12,000 | 1.5 |
| 21-8-33 | 70 | 4,100,000 | .8 | 9,300 | occasional reticulocytes seen. |

CHART 4b.

Name: Ronald K.

DIFFERENTIAL COUNTS. Haemogram (Schilling)

Leishman Stain.

| Date. | Total White Count. | Myelocytes % | Metamyelocytes % | Band forms % | Segmental forms % | Total % |
|---|---|---|---|---|---|---|
| | | | Neutrophile Leucocytes. | | | |
| 2-7-33 | 10,900 | - | 13 | 20 | 0 | 33 |
| 10-7-33 | 11,080 | - | 4.5 | 30 | 2 | 36.5 |
| 18-7-33 | 7,000 | - | 2 | 29 | .5 | 31.5 |
| 24-7-33 | 7,000 | - | 1 | 36 | 4.5 | 41.5 |
| 1-8-33 | 7,000 | - | 9 | 16 | 1 | 26 |
| 7-8-33 | 12,000 | - | 1 | 44 | 3 | 48 |
| 21-8-33 | 9,300 | - | 5 | 17 | 5 | 27 |

| | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles % |
|---|---|---|---|---|
| 2-7-33 | 65 | 2 | 1.5 | - |
| 10-7-33 | 57 | 2.5 | 3 | - |
| 18-7-33 | 62 | 5 | 1 | - |
| 24-7-33 | 52 | 2 | 4 | - |
| 1-8-33 | 67 | 5 | 1 | - |
| 7-8-33 | 50 | 1 | 3 | - |
| 21-8-33 | 62 | 3 | 7 | - |

C A S E  V.

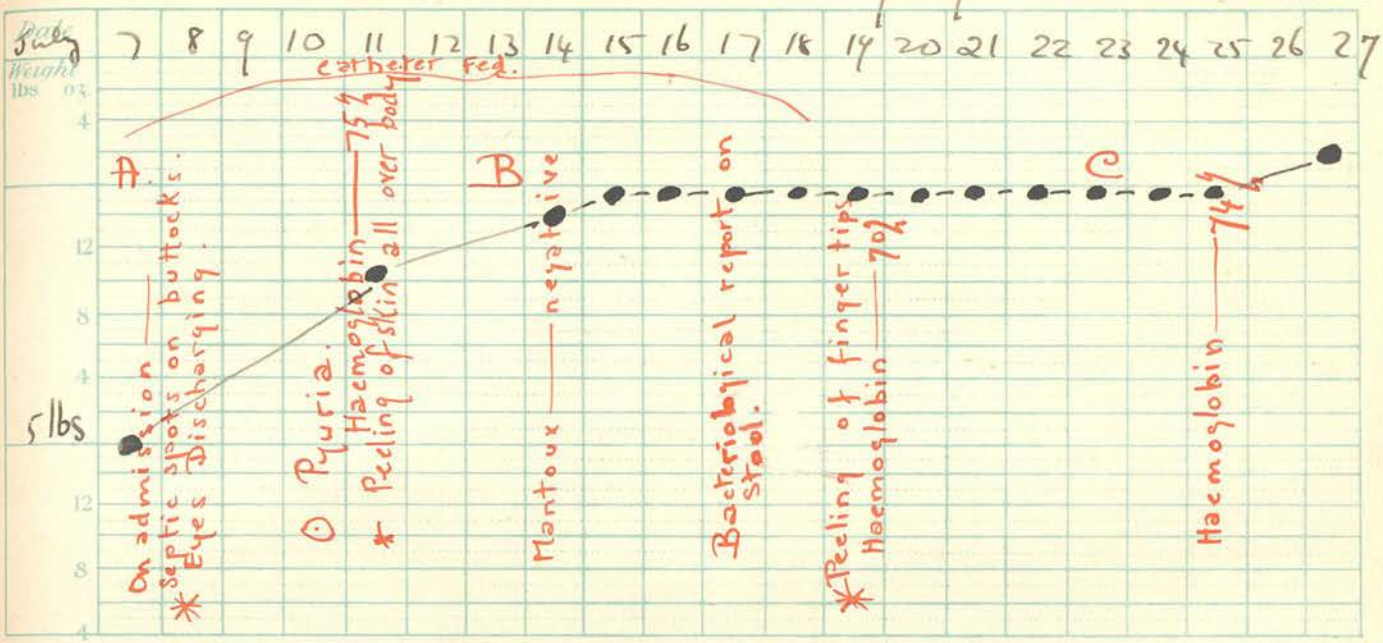
CHARTS 5a & 5b. & 5c.

Chart 5c.

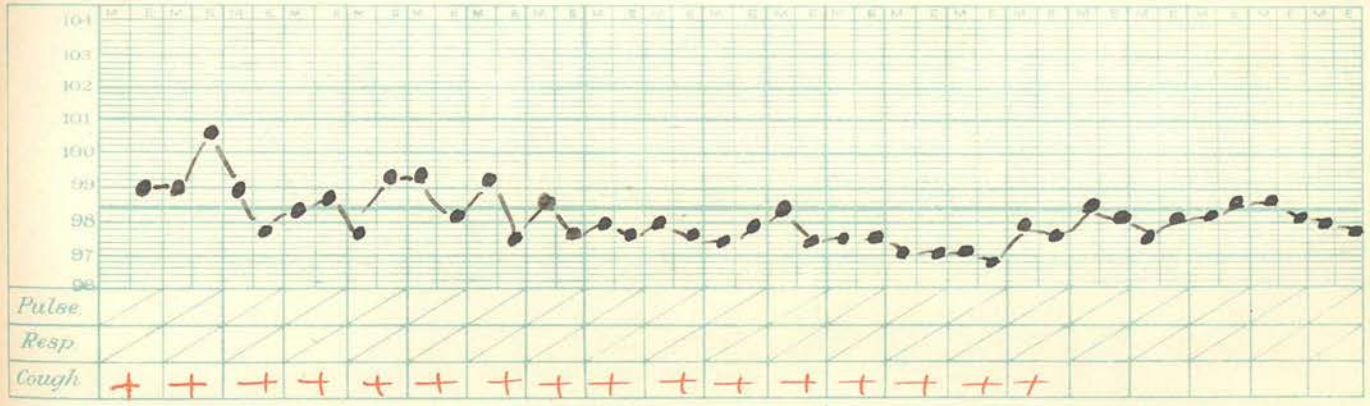
Page 1.

THE BABIES' HOSPITAL NEWCASTLE

Name Jane O. Date of Admission 7.7.33 Age 3 weeks.




| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | | |
| Urine Pus | | | | + | – | + | + | ++ | ++ | – | occas cell | | epith casts | – | | – | – | – | – | – | – | | | |
| Alb | | | | tr | – | tr | tr | tr | tr | – | fair tr | | occas cell | – | tr | – | – | – | tr | – | – | | | |
| Sugar | | | | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | | | |
| Stools N | | | | | 2 | | | | | | | | | | | | | | | | | | | |
| ABN | 3 | 2 | 3 | 1 | | 2R | 1 | 1 | 2 | 1 | 1 | 3 | 4 | 1 | 4 | 4 | 4R | 4R | 2 | 4 | 2 | | | |
| Vomit | | | III | | | | | | | | | | | | | | | | | | | | | |
| Gastric Lavage | | | | | | | | | | | | | | | | | | | | | | | | |
| Appetite | B | B | B | B | B | B | B | B | B | B | B | B | A | A | A | A | A | A | A | A | A | | | |




Notes on Feeding

7.7.33. A. No 2. 7½ 24 ozs
Saline with Glucose.

13.7.33. B. No 3. 7½ 21 ozs.
Till 18.7.33 Fed by Catheter.

23.7.33. C. No 3. 7½ 28 ozs.
Fed by Bottle.

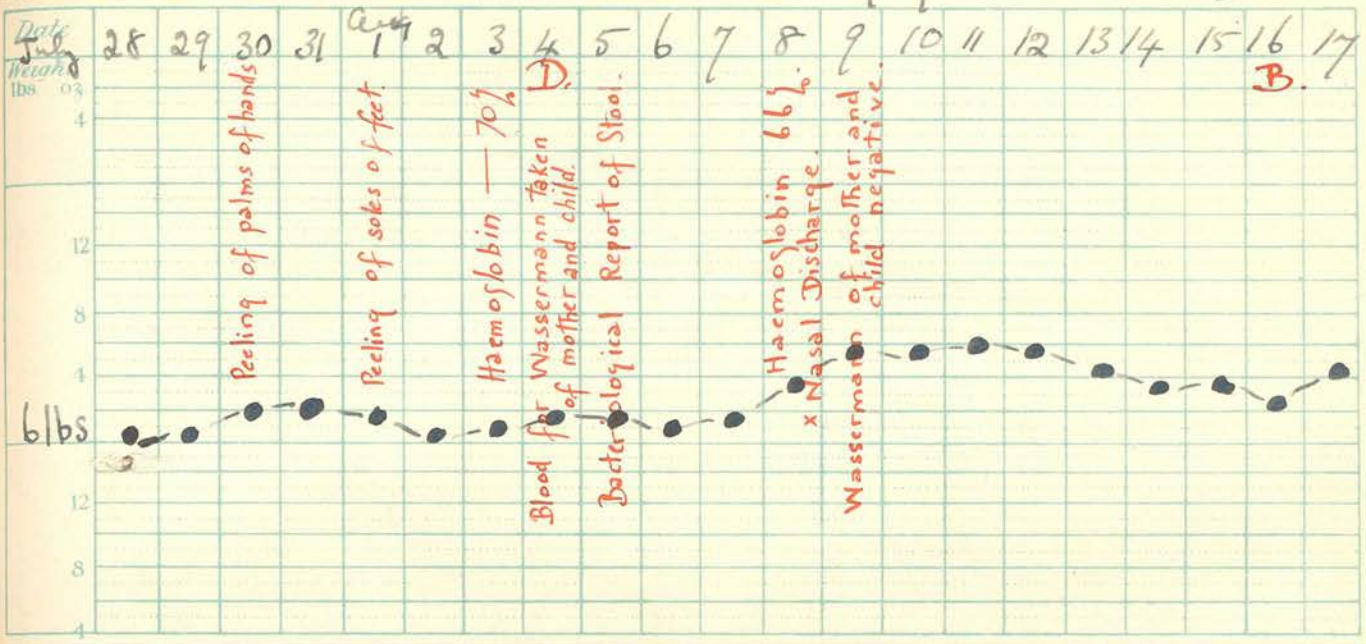
Treatment

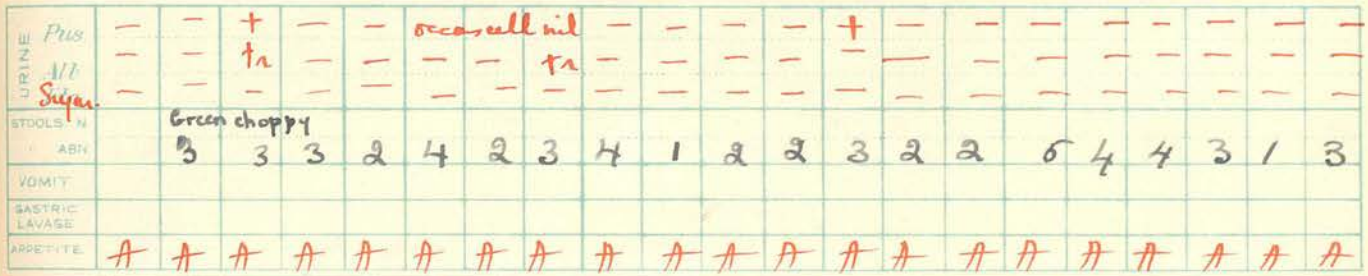
11.7.33. ℞. Pot. Citrate 2t-2 hrly

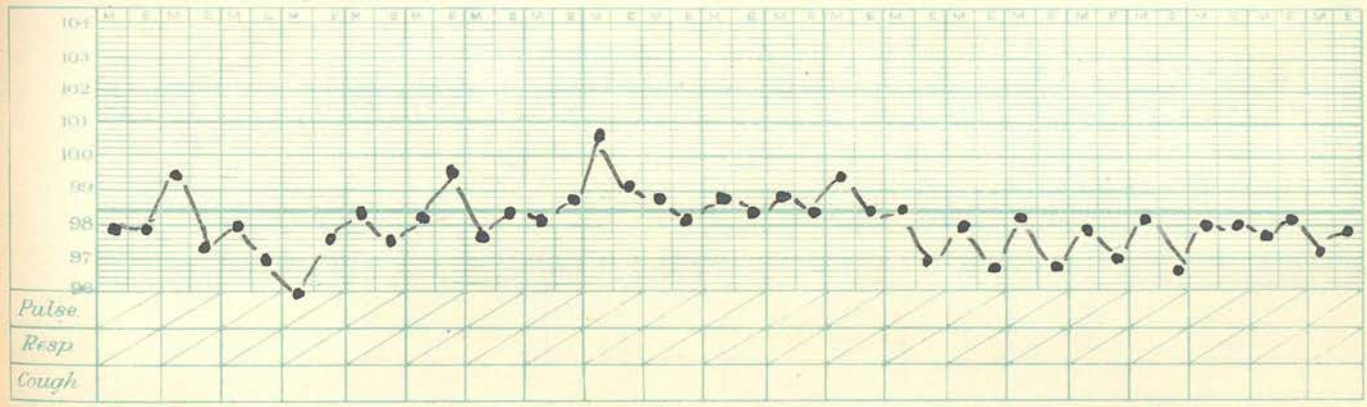
20.7.33. Off. Pot. Cit.

# THE BABIES HOSPITAL NEWCASTLE

Name Jane O. Date of Admission 7.7.33 Age 6 weeks.



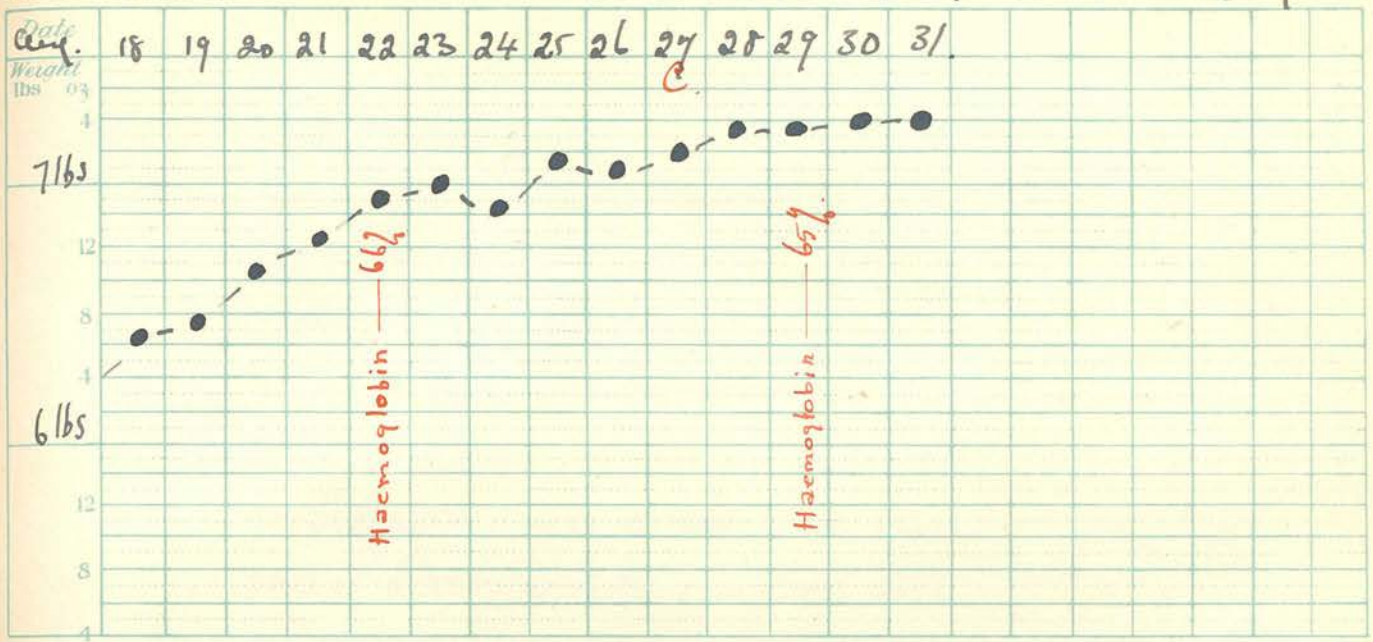

NOTES ON FEEDING

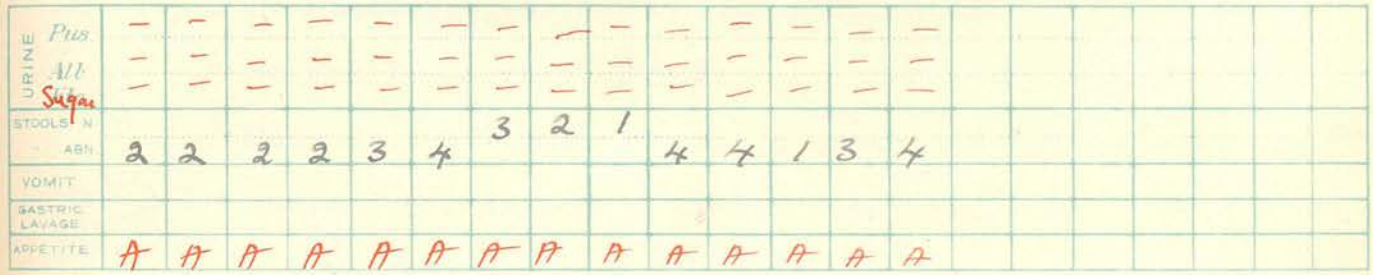
4.8.33. D. Haemolac 28 ozs.
16.8.33. B. No 3 7½% 21 ozs.

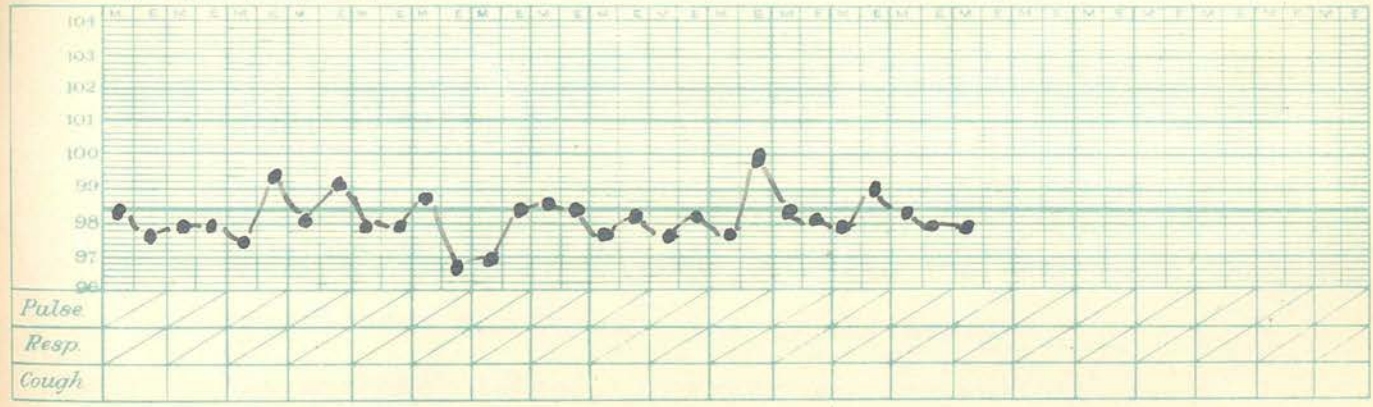
TREATMENT

# THE BABIES' HOSPITAL NEWCASTLE

Name Jane O. Date of Admission 7.7.33. Age 9 weeks.




NOTES ON FEEDING

27.8.33. Feed. C. No 3. 7½ ℥ : 2 8 0 2 3 : with Cereal.

TREATMENT

25.8.33. Rx. Mist Ferri et ammon. cit. zi t.i.d. (grü each dose).

CASE V.

Name: Jane O.

Age on Admission: 3 weeks.

Admitted: 7-7-33.

Reasons for Admission:

I. Going downhill.

Family History:

Mother alive, aged 22 years and well.

Father alive, aged 25 years and well.

No miscarriages.

No family history of T.B.

Poor mother. Married only 5 months.

Husband unemployed. Live in one room, but a light and pleasant room.

Income 23/6 per week .

Present History:

1st baby - full time - instrumental delivery.

Mother very unintelligent and does not know much about the labour though she asserts it was easy labour. Puerperium- uneventful.

Baby breast fed for 14 days, then put on to Glaxo 2 teaspoonfuls to 2 ozs. fed irregularly.

Has been going downhill for past week, does not vomit after feeds.

Motions: green, 3 in 24 hours. No mucus in them.

When 12 days old spots started on neck, one or two and had "mattery heads" to them.

7-7-33 on Examination:

Small, skinny, unhealthy looking baby.

Fontanelle somewhat tense. Admits tips of 3 fingers. Complete absence of subcutaneous tissue. Skin reddened, blotchy, with excoriation of buttocks. Vagina red, no discharge.

Umbilicus red.

Septic spots on buttocks.

Skin of feet, atrophic appearance.

At present there is no aural or nasal discharge, but the eyes are discharging.

Mouth, red, clean.

Heart: No murmurs, sounds closed and pure in all areas.

Lungs: Good air entry. Breath sounds clear - no accompaniments. Slight cough present.

Abdomen: Not distended. No spleic or hepatic enlargement.

Few shoddy glands in groins, discrete,

Few in axillae.

Put on to 24 ozs. (milk and water). Saline and glucose in between feeds.

Baby is too feeble to such and so is catheter fed.

Motions - 3 in past 24 hours, relaxed and with mucus.

8-7-33: 2 relaxed motions with mucus in them.

Temperature 100.8°. Cough present.

9-7-33: 3 relaxed motions, with mucus in them.

3 vomits after feeds.

10-7-33: Urine: Microscopically pus present,

Faint trace of albumen and no Sugar.

11-7-33: Buttocks are extremely red.

2 stools - fairly normal, large in amount.

Urine - clear.

Weight has gone up rapidly to 5 lbs 11 ozs.

There is peeling of skin all over the body.

Few pin point spots over the left leg.

Chest: cough still present. Good air entry.

No accompaniments.

11-7-33: Examination of Blood:

Haemoglobin 75%

Red Blood Corpuscles: 4.250,000 percmm.

Colour Index .9

White Blood Corpuscles: 40,000 per cmm.

Reticulocytes - one or two seen in whole field.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 4% | Total 30.5% |
| Band forms | 26% | |
| Segmental forms | .5% | |
| Lymphocytes | 62% | |
| Monocytes | 2% | |
| Eosinophiles | 6% | |

Red cells appear to be well filled.

12-7-33: Urine: Microscopically pus present.

Trace of Albumen and no sugar.

Weight going up. 2 relaxed stools.

Appetite bad and infant still catheter fed.

13-7-33:

1 green stool.

14-7-33: Mantoux negative.

15-7-33: Weight: 5 lbs. 15 ozs.

Urine contains a good deal of pus microscopically, with a Trace of Albumen and no sugar.

2 yellow, relaxed stools.

16-7-33: Baby refused to suck from bottle.

Breck's feeder has been tried without success.

17-7-33 - 18-7-33: Urine microscopically shows occasional pus cells. Stools still relaxed, vary from 1 to 3 in 24 hours.

17-7-33: Bacteriological Report of faeces:

No B. dysenteriae.

A late, lactose fermenting organism, not generally

recognised, as being pathogenic, was isolated.

18-7-33: Baby has commenced to suck and is being fed by bottle. There is no evidence of fresh sepsis.

19-7-33: The finger tips of both hands are peeling. Soles of feet quite clear.

4 relaxed motions - no mucus.

Few epithelial casts and pus cells in urine.

Weight very stationary for past few days.

Examination of Blood:

Haemoglobin 70%

Red Blood Corpuscles: 3,500,000 per cmm.

Colour Index 1

White Blood Corpuscles: 10500 per cmm.

Reticulocytes .5%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 4% | |
| Band forms | 16% | Total 28% |
| Segmental forms | 8% | |
| Lymphocytes | 65% | |
| Monocytes | 2% | |
| Eosinophiles | 5% | |

20-7-33 - 22-7-33: Average appetite.

Weight still stationary.

4 relaxed motions.

23-7-33: Feed 28 ozs. takes bottle quite well.

24-7-33: 4 relaxed stools.

25-7-33: 2 relaxed stools.

Examination of Blood:

Haemoglobin 74%

Red Blood Corpuscles: 3,950,000 per cmm.

Colour Index .9

White Blood Corpuscles: 10,800 per cmm.

Occasional reticulocytes seen.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 5% | Total 38% |
| Band forms | 33% | |
| Segmental forms | 0% | |
| Lymphocytes | 50% | |
| Monocytes | 2% | |
| Eosinophiles | 9% | |

26-7-33: 4 relaxed, yellow stools.

27-7-33: Weight has gone up to 6 lbs 2 ozs.

Infant is improving and sucking bottle well.

No evidence of fresh sepsis.

Urine is clear.

28-7-33: Urine - clear.

Weight: 6 lbs. 1 ozs.

No stools.

29-7-33: 3 green "choppy" stools.

Slight rise in temperature to 99.4°

30-7-33: Palms of hands are peeling.

Urine: Microscopically contains pus and a faint trace of albumen and no sugar.

3 "choppy" stools.

Weight: 6 lbs. 2 ozs.

31-7-33: Urine - clear.

3 relaxed stools.

1-8-33: Very slow progress.

Soles of feet are peeling a little.

No evidence of fresh sepsis.

Urine - clear.

Appetite average.

2-8-33: Stools have increased to 4 in past 24 hours.

Urine: microscopically pus present.

Weight going down slightly.

3-8-33: Examination of Blood:

Haemoglobin 70%

Red Blood Corpuscles: 3,700,000 per cmm.

Colour Index .9

White Blood Corpuscles: 9,100 per cmm.

Reticulocytes 0%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 3% | |
| Band forms | 23% | Total 28% |
| Segmental forms | 2% | |
| Lymphocytes | 66% | |
| Monocytes | 1% | |
| Eosinophiles | 7% | |

Red cells are quite well filled.

4-8-33: Feed changed to Haemolac - 28 ozs. given per diem.

Blood for Wassermann taken from scalp vein and also Mother's blood taken.

5-8-33: Bacteriological Examination of Stool:

No B. dysenteriae.

No B. typhosus or paratyphosus.

Other organisms: a late lactose fermenting organism not generally recognised as being pathogenic, has been isolated.

Urine - clear.

Stools - 4 in number, relaxed.

Temperature 100.6°.

Physical examination of chest reveals no signs of disease.

6-8-33: Urine - clear. Stools 1 per day relaxed.

7-8-33: Urine - clear. Stools 2 per day relaxed.

8-8-33: Examination of Blood:

Haemoglobin 66%

Red Blood Corpuscles: 3,500,000 per cmm.

Colour Index .9

White Blood Corpuscles: 16,400 per cmm.

Reticulocytes - none seen.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 5% | |
| Band forms | 19.5% | Total 25.0% |
| Segmental forms | .5% | |
| Lymphocytes | 69% | |
| Monocytes | 2% | |
| Eosinophiles | 1.5% | |

Weight is commencing to go up again.

Slight degree of thick nasal discharge.

9-8-33: Urine - pus has reappeared.

No albumen or sugar.

Weight 6 lbs. 5 ozs.

Wassermann Report of child negative.

Wassermann Report of Mother negative.

10-8-33 - 11-8-33: Urine - clear. Weight is steadily maintained.

2 stools, yellow, relaxed, with little mucus in them.

12-8-33: - 13-8-33 :

13-8-33: Urine - clear. 12-8-33: 5 stools, relaxed.

4 stools, yellow relaxed with no mucus in them.

14-8-33:- 15-8-33: Urine - clear.

4 stools, yellow relaxed with no mucus.

16-8-33: Urine - clear .

1 stool, yellow relaxed, with no mucus.

Feed back to B: No.3: 7½%: 21 ozs.

17-8-33: Urine - clear.

3 stools, yellow, relaxed with no mucus.

18-8-33: Urine - clear.

2 stools, yellow, relaxed.

Weight: 6 lbs. 7 ozs.

19-8-33: Urine - clear .

Condition progressing satisfactorily.

20-8-33: Weight: 6 lbs. 11 ozs.

Temperature - 99°.

Condition continues to be very satisfactory.

21-8-33: Progress maintained.

22-8-33: Examination of Blood:

Haemoglobin 66%

Red Blood Corpuscles: 3,400,000 per cmm.

Colour Index .9

White Blood Corpuscles: 13,000 per cmm.

Reticulocytes 1%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 4% | |
| Band forms | 20% | Total 25% |
| Segmental forms | 1% | |
| Lymphocytes | 67% | |
| Monocytes | 3% | |
| Eosinophiles | 5% | |

Red cells show little hypochromia.

The infant is making steady progress. Weight continues to go up. Urine - clear.

3 very slightly relaxed stools. Almost normal inconsistence.

Feeds taken well.

Definite phase of recovery reached.

23-8-33:

4 very slightly relaxed small stools.

Weight up to 7 lbs.

24-8-33: Urine - clear.

3 normal stools.

25-8-33: Weight: 7 lbs 2 ozs.

2 normal stools.

Put on to iron - 6 grs. per day.

26-8-33: 1 normal stool.

27-8-33: Feed increased to 28 ozs. and cereal in form of Sister Laura's food - 1 teaspoonful to each feed added.

28-8-33: Weight : 7 lbs. 3 ozs.

Temperature to 100°.

4 very small slightly relaxed stools.

29-8-33: Examination of Blood:

Haemoglobin 65%

Red Blood Corpuscles: 3,500,000 per cmm.

Colour Index .9

White Blood Corpuscles: 17,100 per cmm.

Reticulocytes 1%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 3% | |
| Band forms | 31% | Total 40% |
| Segmental forms | 6% | |
| Lymphocytes | 58% | |
| Monocytes | 2% | |
| Eosinophiles | 1% | |

Red cells show a fair degree of hypochromia - some are poorly filled.

1 very small relaxed stool.

30-8-33: Urine - clear.

Weight: 7 lbs 4 ozs.

3 small, yellow, relaxed stools.

31-8-33: Urine - clear.

Weight 7 lbs. 4 ozs.

3 very small, relaxed stools. Yellow in colour. Condition of baby excellent, and weight very satisfactory.

## S U M M A R Y of C A S E V.

This case presents several interesting features. On admission underweight infant, who weighed 5 lbs, with skin sepsis and discharging eyes and was too feeble to suck bottle. 3 days after admission pyuria appeared and weight remained stationary over a period of days. After this slump period a phase of improvement occurred, with only occasional pyuria and gastrointestinal upset of a mild character, with persisted for about 3 weeks. Then a further phase of recovery followed with an increase in weight, which was well maintained, and the disappearance of all septic manifestations.

In this case mother gave a history of instrumental delivery with an apparently normal puerperium. The infection must have occurred during delivery and manifested itself when infant was 12 days old in the form of septic skin spots, followed later by parenteral infections of urinary and gastrointestinal tracts.

CHART 1a.

Name: Jean O.

## WEEKLY BLOOD COUNTS.

| Date | Haemoglobin % | Red Blood Corpuscles. | Colour Index. | White Blood Corpuscles. | Reticulocytes. % |
|---|---|---|---|---|---|
| 11-7-33 | 75 | 4,250,000 | .9 | 40,000 | occasional one seen. |
| 19-7-33 | 70 | 3,500,000 | 1 | 10.500 | .5 |
| 25-7-33 | 74 | 3,950,000 | .9 | 10,800 | occasional one seen. |
| 3-8-33 | 70 | 3,700,000 | .9 | 9,100 | 0 |
| 8-8-33 | 66 | 3,500,000 | .9 | 16,400 | 0 |
| 22-8-33 | 66 | 3,400,000 | .9 | 13,000 | 1 |
| 29-8-33 | 65 | 3,500,000 | ,9 | 17,100 | 1 |

CHART 5b.

Name: Jean O.

DIFFERENTIAL COUNTS. Haemogram (Schilling)

Leishman Stain.

| Date | Total White Count | Myelocytes. | Metamyelocytes | Band forms | Segmental forms. | Total. |
|---|---|---|---|---|---|---|
| | % | % | % | % | % | % |
| | | | Neutrophile Leucocytes. | | | |
| 11-7-33 | 40,000 | - | 4 | 26 | .5 | 30.5 |
| 19-7-33 | 10,500 | - | 4 | 16 | 8 | 28 |
| 25-7-33 | 10,800 | - | 5 | 33 | 0 | 38 |
| 3-8-33 | 9,100 | - | 3 | 23 | 2 | 28 |
| 8-8-33 | 16,400 | - | 5 | 19.5 | .5 | 25 |
| 22-8-33 | 13,000 | - | 4 | 20 | 1 | 25 |
| 29-8-33 | 17,100 | - | 3 | 31 | 6 | 40 |

| | Lymphocytes % | Monocytes % | Eosinophiles % | Basophiles. % |
|---|---|---|---|---|
| 11-7-33 | 62 | 2 | 6 | - |
| 19-7-33 | 65 | 2 | 5 | - |
| 25-7-33 | 50 | 2 | 9 | - |
| 3-8-33 | 66 | 1 | 7 | - |
| 8-8-33 | 69 | 2 | 1.5 | - |
| 22-8-33 | 67 | 3 | 5 | - |
| 29-8-33 | 58 | 2 | 1 | - |

# C A S E  VI

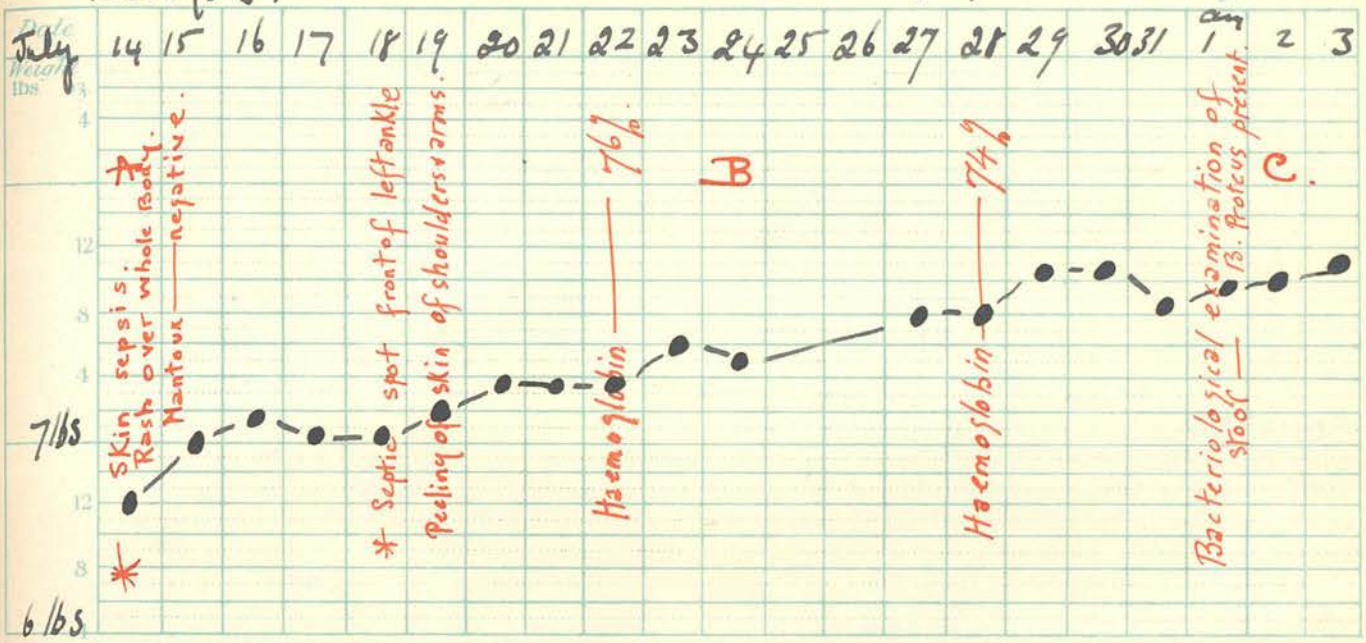
Charts 6a & 6b. & 6c.

Chart 6c.

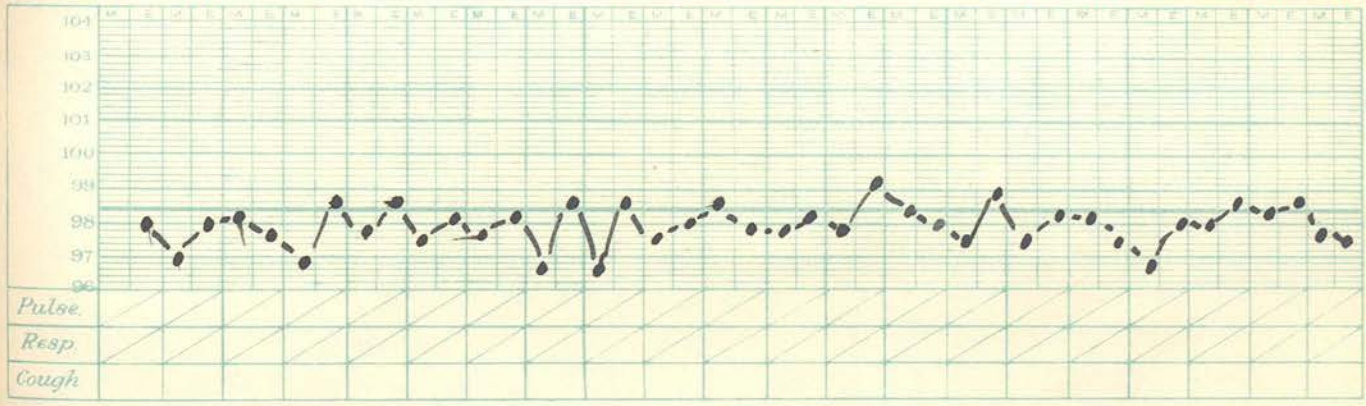


THE BABIES HOSPITAL NEWCASTLE

Name George G. Date of Admission 14·7·33 Age 5 weeks.




| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Urine Pus | — | — | — | — | — | — | — | — | — | — | — | — | — | occas. | — | occas. | — | — | occas. | — | | |
| Alb | — | — | — | — | — | — | — | — | — | — | — | — | — | tr | — | — | — | — | — | — | | |
| Sugar | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | | |
| Stools N | Green | Choppy | .. | .. | Yellow | 2 | Yellow | | | | | | | | | | | | | | | |
| ABN | 1 | 3 | 3 | 1 | 2R | | 3R | 2 | 1 | 3 | 3 | 4R | 3 | 4R | 5R | 4 | 4 | 3 | 1 | 1 | 1 | |
| Vomit | | | | | | | | | | | | | | | | | | | | | | |
| Gastric Lavage | | | | | | | | | | | | | | | | | | | | | | |
| Appetite | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A |




NOTES ON FEEDING

14·7·33. A. No 3. 7½ 4 28 ozs : 7 feeds

24·7·33. B. No 4. 7½ 4 28 ozs : 7 feeds

2·8·33. C. No 4 7½ 4 28 ozs with Sister Laura's food. : 7 feeds.

TREATMENT

THE BABIES' HOSPITAL NEWCASTLE

Name George G. Date of Admission 14.7.33 Age 8 weeks.

Aug. 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23.

Weight lbs

8 lbs

7 lbs

Haemoglobin — 74%
Bacteriological exam. of stool —
Morgan No I present.

Haemoglobin — 68%.

Discharged.

Seen as an Out Patient.
Haemoglobin — 66%.

URINE Pus — — — — — — — — — — — — —
Alb — — — — — — — — — — — — —
Sugar — — — — — — — — — — — — —

STOOLS N
ABN 2 3 2 2 1 1 1 1 - 1 3 4 1

VOMIT

GASTRIC LAVAGE

APPETITE G G G G G G G G G G G G G

104
103
102
101
100
99
98
97
96

Pulse

Resp

Cough

NOTES ON FEEDING

TREATMENT

# C A S E VI.

Name: George G.

Age on Admission: 5 weeks.

Admitted: 14-7-33.

Reasons for Admission:

I. Losing weight.

II. Septic spots.

Family History:

Mother alive and well. Aged 21 years.

Father alive and well. Aged 21 years.

No miscarriages.

No family history of T.B.

Grandmother has asthma.

Quite a good deal of living space at home.

Father unemployed.

Present History:

1st baby: full time: instrumental labour.

Weight at birth not known.

Breast fed for 3 weeks: Breast and Barley water given for another week. Then put on to Robinson's Patent Barley and milk for 1 week. Finally feeds changed to Ostermilk - 3 measures of Ostermilk to 6 tablespoonfuls of water (i.e. 3 ozs : 3 hourly).

No vomiting after feeds.

Motions - 3-4 per day: yellow.

Puerperium: normal: no fever. Mother in bed for 14 days.

The baby was quite well until 14 days ago.

Circumcision done and followed by good deal of bleeding afterwards. 3 days ago spots came out on head: legs: thighs: lower part of abdomen and face. The ones on the head appeared first - followed by 2 large spots on legs and abdomen and then over rest of body as mentioned above.

Baby is losing weight: weighs 6 lbs. 12 ozs.

11-7-33 Seen in Out Patients.

A miserable shrunken looking infant with speckled face. Numerous red raised spots over whole body- lower part of abdomen especially large looking red raised spots.

Penis clean and healed.

Some peeling on face, arms, legs and back in between areas of spots.

Examination on 14-7-33:

A poorly small nourished infant: dehydrated looking: Anterior Fontanelle flush with surface - admits 2 finger tips. There is no aural or nasal discharge. Umbilicus clear.

Skin: Fine rash like appearance over body: face and arms - skin of these parts is beginning to peel. Palms of hands and soles of feet not peeling. The eyes are not discharging.

Mouth - clean. fauces red. Tongue clean and moist. There are no enlarged glands in cervical: supraclavicular: axillary or groin regions.

Chest: Fairly well covered.

Heart: Resting rate - 160 per minute.
There are no murmurs. Both sounds closed and pure in all areas.
Lungs: Percussion note resonant throughout.
Good air entry. No accompaniments to breath sounds.
Abdomen: Not distended. Liver palpable below costal margin. Spleen not palpable.
Urine: Miscroscopically - No pus, Albumen or Sugar.
Stools: green, choppy.
Infant fed on Cow's milk and water - 28ozs. 7 feeds.
Appears hungry. Is taking food well and has commenced from 14th to 15th to put on weight.
Mantoux negative.

15-7-33:
Urine: Clear.
Stools: 3 - green. Small and "choppy" (contain mucus).
Weight: 7 lbs.
Infant is taking feeds well.

16-7-33: Weight: 7 lbs. 2 ozs.
3 green "choppy" stools.

18-7-33: Stools - 2 yellow, relaxed.
Septic spot in front of left ankle.

19-7-33: Peeling of skin on shoulders and arms.
Stools: 2, yellow; - quite normal.

20-7-33: Urine - clear.
Weight: 7 lbs. 3 ozs.

3 relaxed, yellow stools.

Appetite average.

No temperature.

21-7-33: Urine - clear.

22-7-33: Urine - clear.

Weight stationary past day or two.

Examination of Blood:

Haemoglobin 76%

Red Blood Corpuscles: 4,900,000 per cmm.

Colour Index .7

White Blood Corpuscles: 8,000 per cmm.

Reticulocytes - an occasional one seen but insufficient to be recorded as a percentage.

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 2% | |
| Band forms | 21% | Total 28% |
| Segmental forms | 5% | |
| Lymphocytes | 66% | |
| Monocytes | 5% | |
| Eosinophiles | 2% | |

Red cells show very little hypochromia.

23-7-33: Urine - clear.

24-7-33: Urine - clear.

Weight is commencing to go up.

No evidence of fresh sepsis.

Food changed to stronger mixture (4 parts of milk - 2 parts of water). 28 ozs. 7 feeds.

26-7-33: Stools - 4 relaxed, yellow.

26-7-33: Slight rise of temperature to 99°.

27-7-33: Urine: Microscopically occasional pus cell.
Trace of Albumen.
No Sugar.

4 relaxed, yellow stools.

Weight going up.

28-7-33: 5 very small, yellow stools.

Examination of Blood:

Haemoglobin 74%

Red Blood Corpuscles: 3,900,000 per cmm.

Colour Index .9

White Blood Corpuscles: 9,000 per cmm.

Reticulocytes - occasional on seen.

Differential Count.

| | | |
|---|---|---|
| Metamyelocytes | 7% | |
| Band forms | 31% | Total 42% |
| Segmental forms | 4% | |
| Lymphocytes | 51% | |
| Monocytes | 5% | |
| Eosinophiles | 2% | |

Red cells shown little hypochromia.

29-7-33: Urine: Microscopically occasional pus cell.

4 relaxed stools.

30-7-33: Urine: Microscopically occasional puscell.

4 relaxed stools.

31-7-33: 3 greenish yellow stools.

buttocks excoriated.

Weight going up.

No fresh sepsis.

1-8-33: Bacteriological examination of stool:

Bacillus proteus present.

2-8-33: Sister Laura's food added to No.4 mixture.

4-8-33: Examination of Blood:

Haemoglobin 74%

Red Blood Corpuscles: 4,400,000 per cmm.

Colour Index .8

White Blood Corpuscles: 9,400 per cmm.

Reticulocytes 2%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 8% | Total 29% |
| Band forms | 16% | |
| Segmental forms | 5% | |
| Lymphocytes | 67% | |
| Monocytes | 1% | |
| Eosinophiles | 3% | |

Bacteriological Examination of Stool:

No B. typhosus: paratyphosus or Dysenteriae.

Morgan No 1. bacillus present.

5-8-33: Urine - clear. Microscopically no pus

Albumen or Sugar.

3 relaxed stools.

6-8-33:

9-8-33: Urine - clear. Microscopically no pus

Albumen or sugar.

2 relaxed stools, on 6-8-33 & 7-8-33.

Weight is steadily going up.

Complexion pale. Baby is taking feeds very well.

Examination of Blood: 9-8-33:

Haemoglobin 68%

Red Blood Corpuscles: 3,800,000 per cmm.

Colour Index .8

White Blood Corpuscles: 9,400 per cmm.

Reticulocytes 2%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 4.5% | Total 39% |
| Band forms | 27.5% | |
| Segmental forms | 7 % | |
| Lymphocytes | 56% | |
| Monocytes | 3% | |
| Eosinophiles | 2% | |

Red cells show hypochromia.

10-8-33 - 16-8-33: There is a steady gain in weight - 8 lbs. 13 ozs.

Urine has remained clear.

Stools almost normal - slightly relaxed.

Infant smiles, looks bright and is contented.

Seen as an Out Patient on 23-8-33.

Infant appeared to be in good condition and no fresh evidence of sepsis.

23-8-33:

The Blood Picture showed the following:-

Haemoglobin 66%

Red Blood Corpuscles: 3,500,000 per cmm.

Colour Index .9

White Blood Corpuscles: 9,000 per cmm.

Reticulocytes 1%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 4% | Total 37% |
| Band forms | 25% | |
| Segmental forms | 8% | |
| Lymphocytes | 60% | |
| Monocytes | 1% | |
| Eosinophiles | 2% | |

Red cells showed little hypochromia.

Seen as an Out Patient on 30-8-33.

Weight: 9 lbs.

Takes feeds very well and is progressing very favourably. No evidence of any skin sepsis.

30-8-33:

Examination of Blood:

Haemoglobin 67%

Red Blood Corpuscles: 3,800,000 per cmm.

Colour Index .9

White Blood Corpuscles: 9,500 per cmm.

Reticulocytes 1%

Differential Count:

| | | |
|---|---|---|
| Metamyelocytes | 5% | Total 19.5% |
| Band forms | 10.5% | |
| Segmental forms | 4% | |
| Lymphocytes | 74% | |
| Monocytes | 3.5% | |
| Eosinophiles | 3% | |

Red Cells show a slight degree of hypochromia.

Clinical condition of infant excellent.

## S U M M A R Y of C A S E VI

This case demonstrates one of "failure to gain weight" - with mild skin sepsis and gastrointestinal disturbance of a mild character. There was very little disturbance of the renal tract - occasional pus cells were found, but never an abundant pyuria. With careful hospital regime and proper feeding the case cleared up very well.

In this case there was no history of contamination at birth or puerperal sepsis in Mother.

CHART 6a.

Name: George G.

## WEEKLY BLOOD COUNTS.

| Date | Haemoglobin % | Red Blood Corpuscles per cmm. | Colour Index | White Blood Corpuscles per cmm. | Reticulocytes % |
|---|---|---|---|---|---|
| 22-7-33 | 76 | 4,900,000 | .7 | 8,000 | occasional one seen. |
| 28-7-33 | 74 | 3,900,000 | .9 | 9,000 | ditto. |
| 4-8-33 | 74 | 4,400,000 | .8 | 9,400 | 2 |
| 9-8-33 | 68 | 3,800,000 | .8 | 9,400 | 2 |
| 23-8-33 | 66 | 3,500,000 | .9 | 9,000 | 1 |
| 30-8-33 | 67 | 3,800,000 | .9 | 9.500 | 1 |

CHART 6b.

Name: George G.

DIFFERENTIAL COUNTS. Haemogram (Schilling)

Leishman Stain.

| Date | Total White Count | Myelocytes | Metamyelocytes | Band forms | Segmental forms | Total |
|---|---|---|---|---|---|---|
| | % | % | % | % | % | % |
| | | Neutrophile Leucocytes. | | | | |
| 22-7-33 | 8,000 | - | 2 | 21 | 5 | 28 |
| 28-7-33 | 9,000 | - | 7 | 31 | 4 | 42 |
| 4-8-33 | 9,400 | - | 8 | 16 | 5 | 29 |
| 9-8-33 | 9,400 | - | 4.5 | 27.5 | 7 | 39 |
| 23-8-33 | 9,000 | - | 4 | 25 | 8 | 37 |
| 30-8-33 | 9,500 | - | 5 | 10.5 | 4 | 19.5 |

| | Lymphocytes | Monocytes | Eosinophiles | Basophiles |
|---|---|---|---|---|
| | % | % | % | % |
| 22-7-33 | 66 | 5 | 2 | 0 |
| 28-7-33 | 51 | 5 | 2 | 0 |
| 4-8-33 | 67 | 1 | 3 | 0 |
| 9-8-33 | 56 | 3 | 2 | 0 |
| 23-8-33 | 60 | 1 | 2 | 0 |
| 30-8-33 | 74 | 3.5 | 3 | 0 |

## C A S E VII.

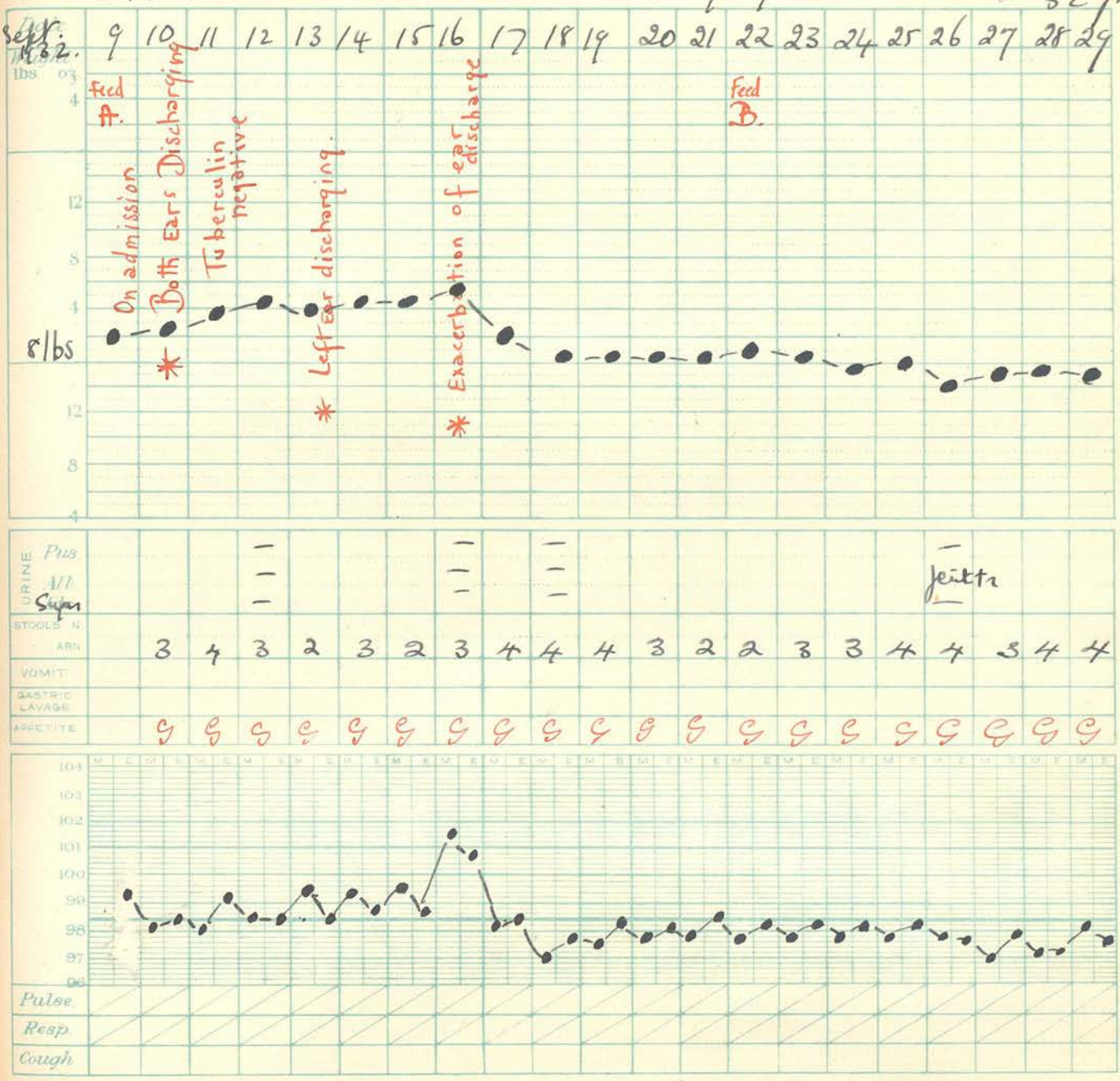
Chart 7c.

Chart 7c.

Page 1.

THE BABIES' HOSPITAL NEWCASTLE

Name Richard T. Date of Admission 9.9.32 Age 10/52 yrs.


Sept. 1932.
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
lbs. oz
Feed A.
Feed B.
On admission
Both ears Discharging
Tuberculin negative
Left ear discharging.
Exacerbation of ear discharge
8 lbs
12
8
4
URINE Pus Alb Sugar
Jaundice
STOOLS N ABN
3 4 3 2 3 2 3 4 4 4 3 2 2 3 3 4 4 3 4 4
VOMIT
GASTRIC LAVAGE
APPETITE
M E M E M E

THE BABIES' HOSPITAL NEWCASTLE

Name Richard T. Date of Admission 9.9.32 Age 10/52 yrs.

| Date | Sept. 30 | Oct 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weight lbs oz | Feeds. | | | | | | | | | | | | | | | | | | | | |
| URINE Pus | | | | – | | | – | | | | – | | | | | – | | | – | | |
| Alb. | | | | tr | | | – | | | | – | | | | | – | | | – | | |
| Sugar | | | | – | | | – | | | | – | | | | | – | | | – | | |
| STOOLS N | 2 | 2 | 4 | 3 | 4 | 3 | 2 | 4 | 3 | 4 | 4 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 5 | 3 |
| ABN | | | | | | | | | | | | | | | | | | | | | |
| VOMIT | | | | 1 | | | | 1 | | | | | | | | | | | | | |
| GASTRIC LAVAGE | | | | | | | | | | | | | | | | | | | | | |
| APPETITE | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G |

7 lbs

* Left ear discharging.

Pulse

Resp.

Cough

NOTES ON FEEDING

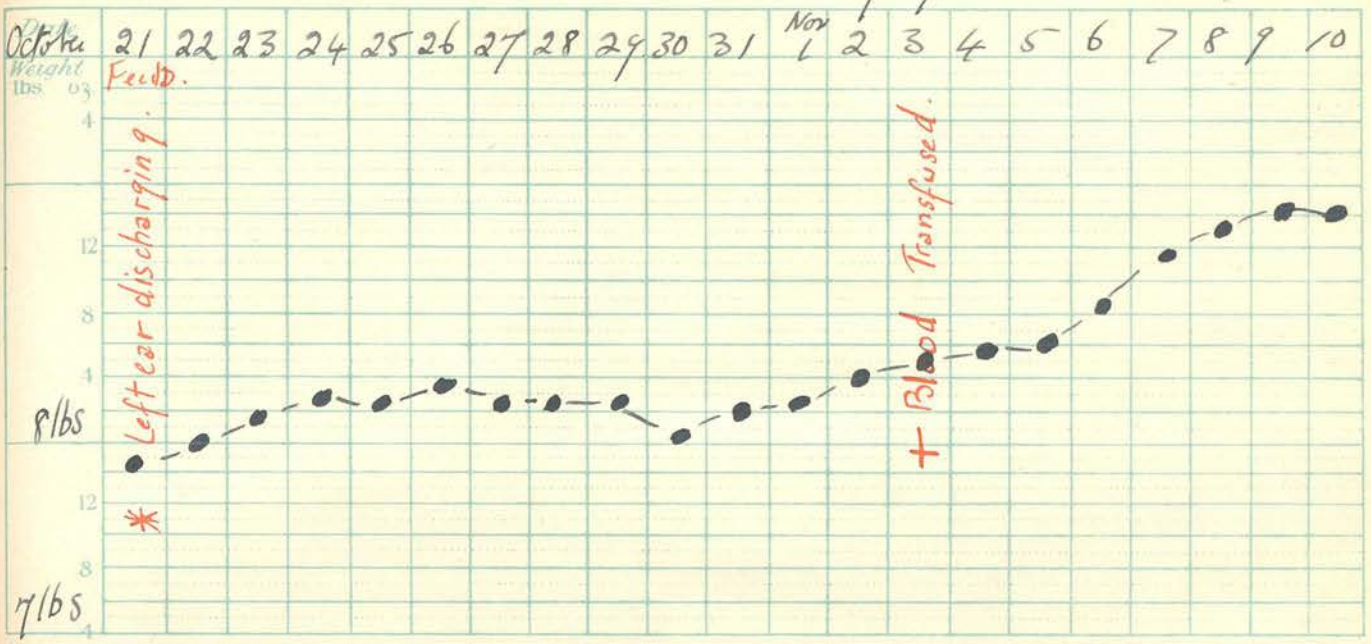
30.9.32 16 ozs milk } 4 feeds
7½ grs sugar }

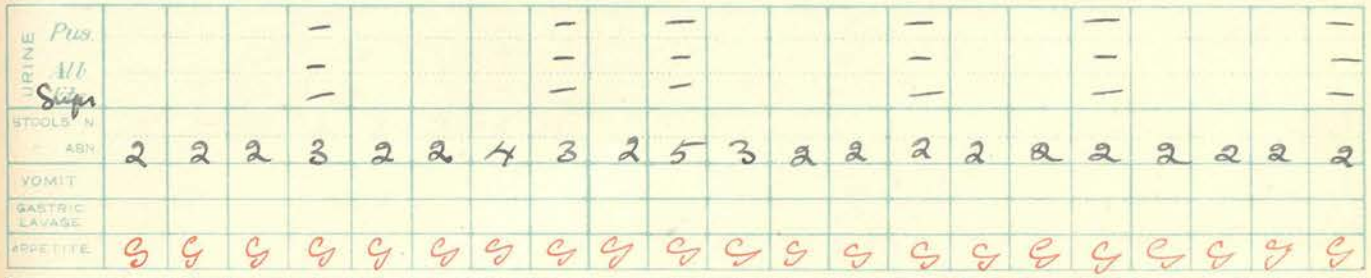
Ostermilk 12 ozs 3 feeds.

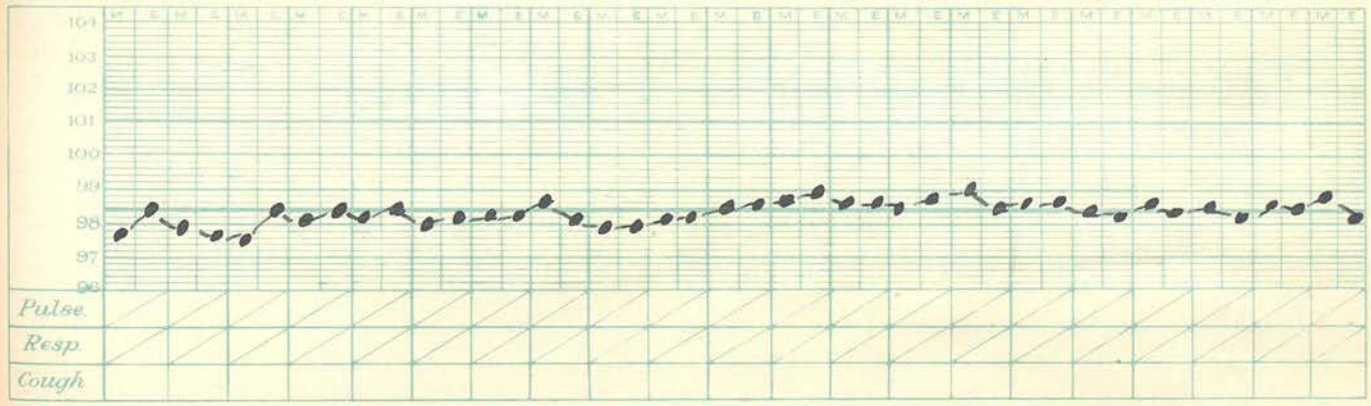
TREATMENT

# THE BABIES' HOSPITAL NEWCASTLE

Name Richard T. Date of Admission 9.9.32 Age 3 months.



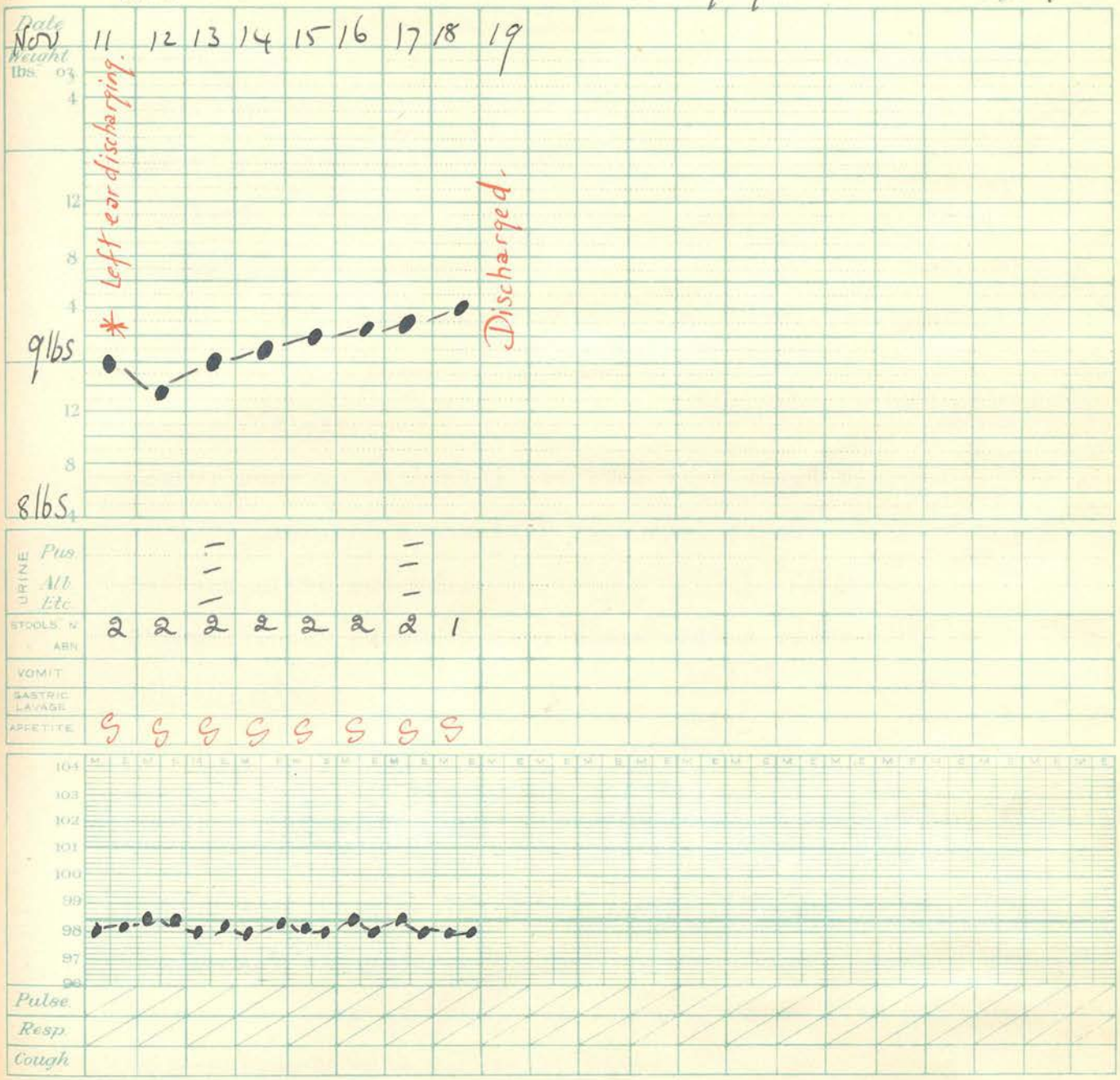

NOTES ON FEEDING

Feed D.
21.10.32 2 Boz s : 7 feeds.
7½% sugar.

TREATMENT

# THE BABIES' HOSPITAL NEWCASTLE

Name Richard T. Date of Admission 9.9.32 Age 4 months




NOTES ON FEEDING

Feed as before + Butter flour mixture — 6ozs.

TREATMENT

# C A S E VII

Name: Richard T.

Age on Admission: 10 weeks.

Admitted: 9-9-32.

Reasons for Admission:

I. Feeding trouble and wasting.

II. Discharging ears.

Family History:

Mother sent to Maternity Hospital when child was 14 days old - on account of puerperal sepsis.

Husband alive and well.

Circumstances fair. Occupy house with 4 rooms.

Present History:

2nd child: full time: normal labour.

Weight of baby at birth 8½ lbs.

Breast fed for 14 days - vomited little after feeds - put on to Ostermilk for 3 weeks, then changed to Cow's milk and water.

Mother confined at home, but transferred on 14th day to Princess Mary's Maternity Home.

The record of stay in hospital was as follows:-

Admitted on 11-7-32 having been delivered at home 14 days previously. The delivery, as far as ascertained, was normal. On admission general condition fair - Pulse 100. Temperature 99°.

The uterus was enlarged and tender, the lochia offensive. The urine was normal - no albumen or pus.

Nothing else to note in abdomen apart from the uterine condition. Mother was an In Patient of this Institution for 12 days.

On 2 occasions her temperature became 101°F. - was treated in Fowler's position and free purgation. Temperature remained normal for 4 days, and patient was then discharged.

Gynaecological Diagnosis: A mild degree of septicaemia following infection of the placental site.

The infant appeared fairly well until 14 days old - when left ear commenced to discharge. There were no septic spots anywhere. Baby became listless - went downhill, and at the age of 10 weeks was admitted to hospital.

The motions were frequent - green in colour.

The baby remained in Hospital for 3 months, during which time the condition was as follows:-

Examination:

Small baby, some loss of subcutaneous fat.

No marked dehydration. Fontanelle open, not bulging.

Admits tips of 2 fingers.

? septic spot on left leg.

No glands in groins. Cervical adenitis on left side.

Left ear discharging profusely. Right ear also discharging.

Buttocks: sore. Stools - soft, greenish yellow.

Chest: Nothing abnormal to note.

Heart: nil. Abdomen: nil.

11-9-32: Mantoux negative.

13-9-32: Profuse discharge - left ear.

16-9-32: More profuse discharge left ear.

22-9-32: Feed increased to 25 ozs. and strengthened.

25-9-32: Ear discharging profusely: thick, green pus. foul smelling.

5-10-32: Weight dropping.

14-10-32: Discharge from left ear is very slight . Baby taking feeds well.

21-10-32: Feed increased to 28 ozs. Weight commencing to go up.

1-11-32: Left ear discharge increasing in amount.

3-11-32: Blood transfused. Donor child's mother taken from anterior cubital veins into citrate solution. 22 ccs. injected into Saphenous vein.

4-11-32: Baby quite comfortable.

7-11-32: Gaining weight.

10-11-32: Wound healing.

12-11-32: Stitches removed from skin incision. Butter & flour mixture - 6 ozs. added to feeds.

13-11-32: Ear discharge still present.

18-11-32: Child discharged.

Ear discharge negligible.

Child seen by me as an Out Patient on 27-6-33.

Baby is very tanned by sun: bright and happy, but Mother reports that ear discharge has been persistent since discharge from Hospital. 1 month after discharge developed Whooping Cough, but recovered well from it.

Now almost a year old - attempting to walk.

The mucous membranes are very pale. Anterior Fontanelle patent - admits tips of 2 fingers.

Left ear discharging thin seropurulent material.

There is no glandular enlargement in cervical region - axilla or groins.

2 teeth present: 2 lower ones and 1 upper central incisor.

For its age baby is a good size and mentally alert.

Takes interest in things around him.

Chest and heart show nothing abnormal.

Abdomen: Spleen is palpable below costal margin.
There is no hepatic enlargement.

Urine is clear and does not contain albumen or pus.

Haemoglobin is 65%.

There is no evidence of rickets anywhere.

The child has been put on Ferri et ammon. cit. (grs.5t.i.d.)

Photograph of Richard T. Aged 1 year 27-6-33.
The infant has an obviously happy expression
and appears in good condition.

To face Case VII. p.5.

## S U M M A R Y of C A S E VII.

This case presents an infection in form of otorrhoea on the 14th day of life.
There was failure to progress, and gastrointestinal symptoms occurred from time to time.
A definite history of puerpal sepsis was obtained in this case.

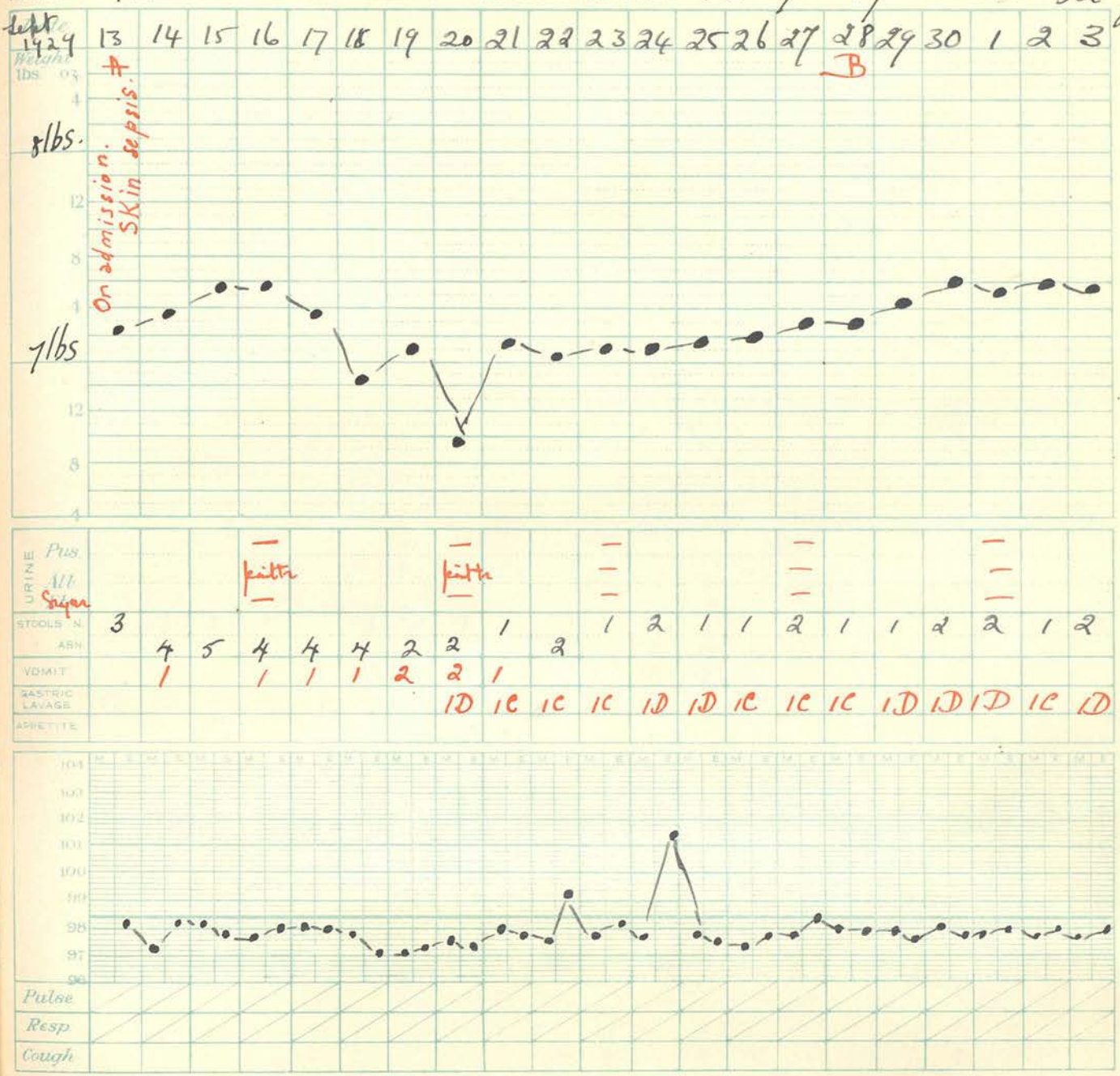
C A S E VIII.

CHART 8c.

Chart 8c. Page 1.

THE BABIES HOSPITAL NEWCASTLE

Name Elsie B. Date of Admission 13·9·29 Age 6/52 yrs.




NOTES ON FEEDING

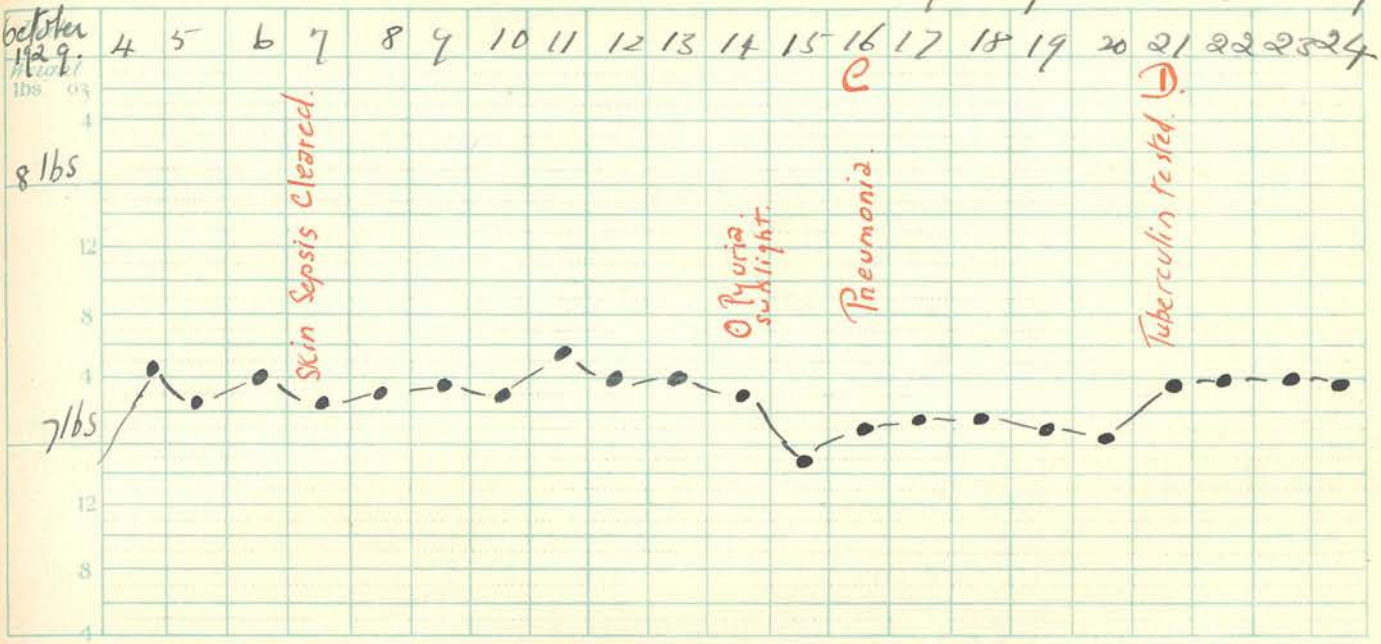
13·9·33 A. 21ozs 4½% sugar 3i Lactic Acid to the pint.

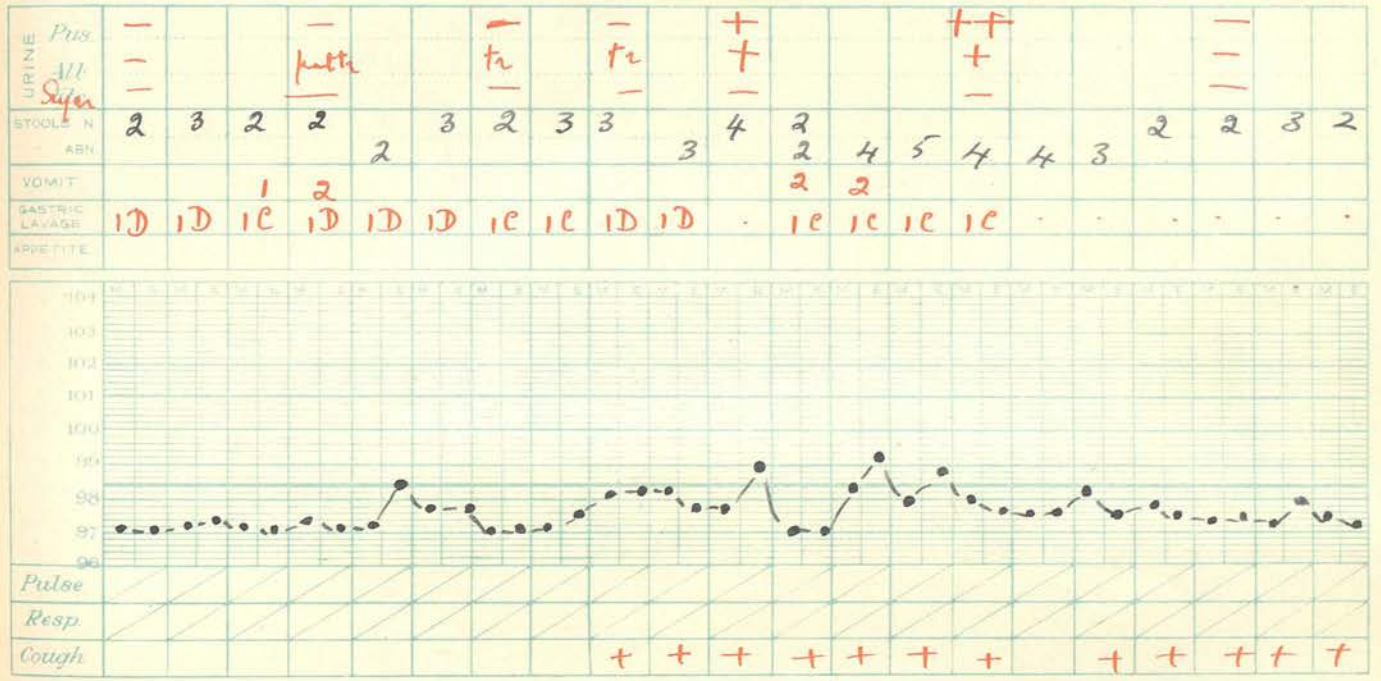
28·9·33 B. No3. 10% 20ozs + Lactic acid.

TREATMENT

# THE BABIES' HOSPITAL NEWCASTLE

Name Elsie B. Date of Admission 13·9·29 Age 6/52 yrs.




NOTES ON FEEDING

16·10·33 C. No 3. 10½ 21025.

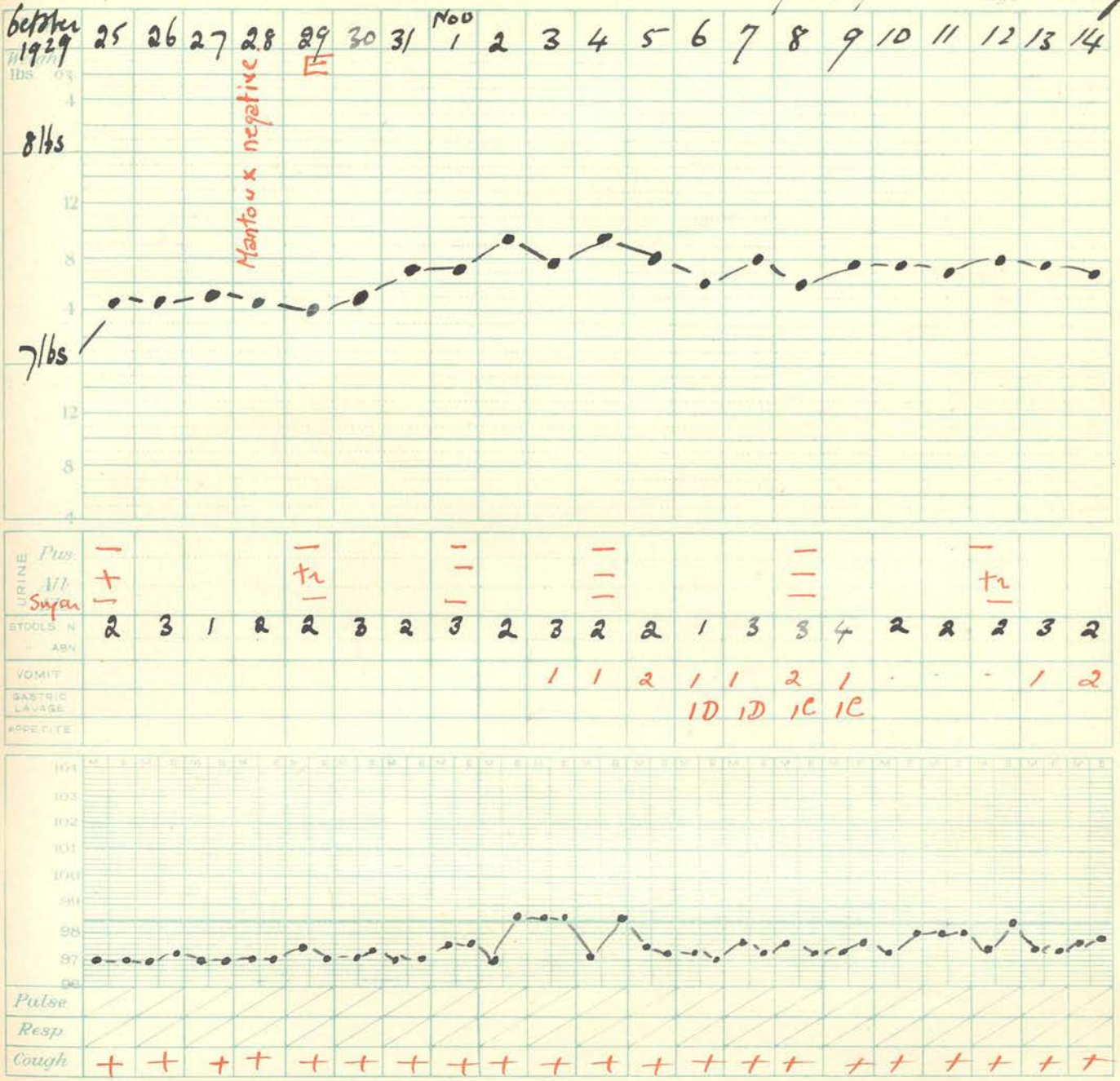
21·10·33 D. No 3. 10½ 25025.

TREATMENT

THE BABIES' HOSPITAL NEWCASTLE

Page 2.

Name Elsie B. Date of Admission 13.9.29 Age 6/52 yrs.



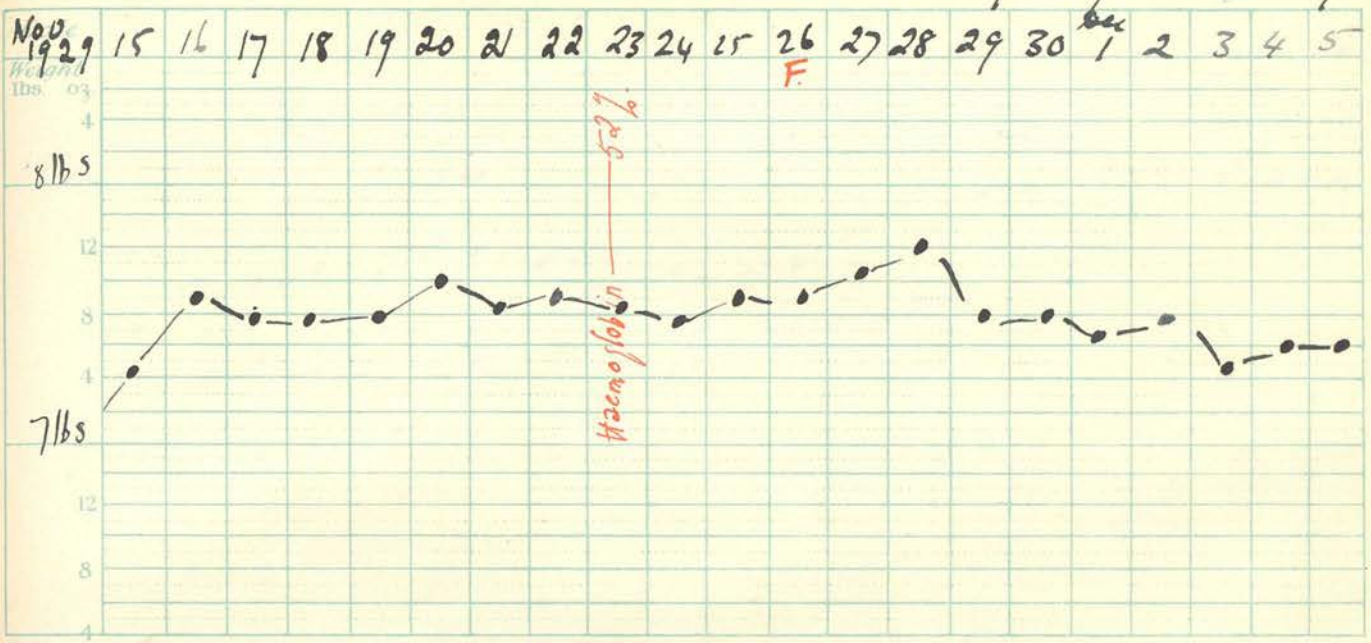

NOTES ON FEEDING

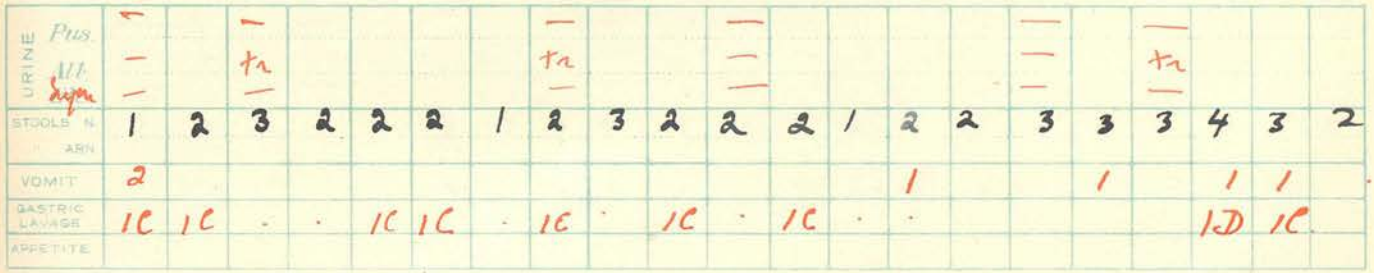
29.10.33 E. No 4 7½% sugar 25ozs.

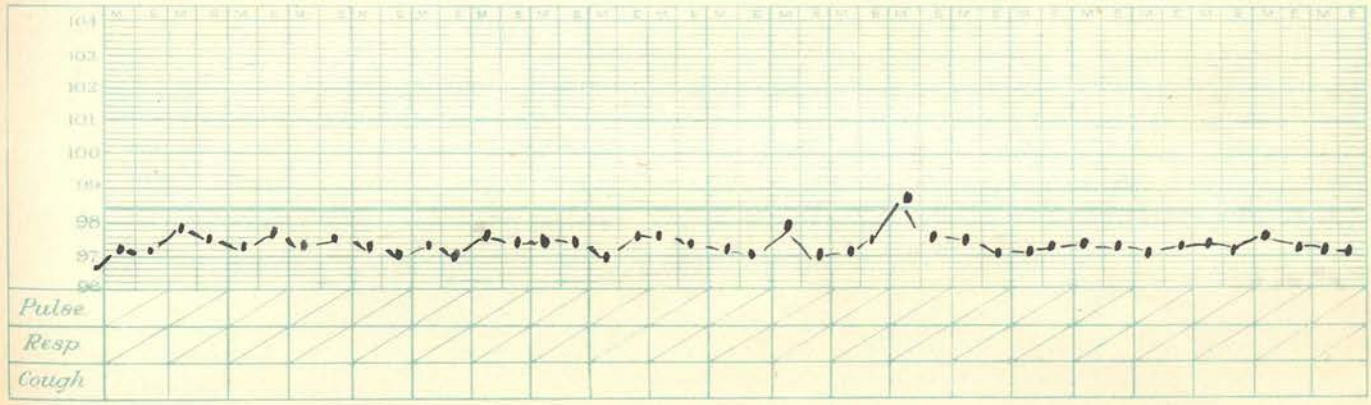
TREATMENT

# THE BABIES' HOSPITAL NEWCASTLE

Name Elsie B. Date of Admission 13.9.29 Age 4 months.



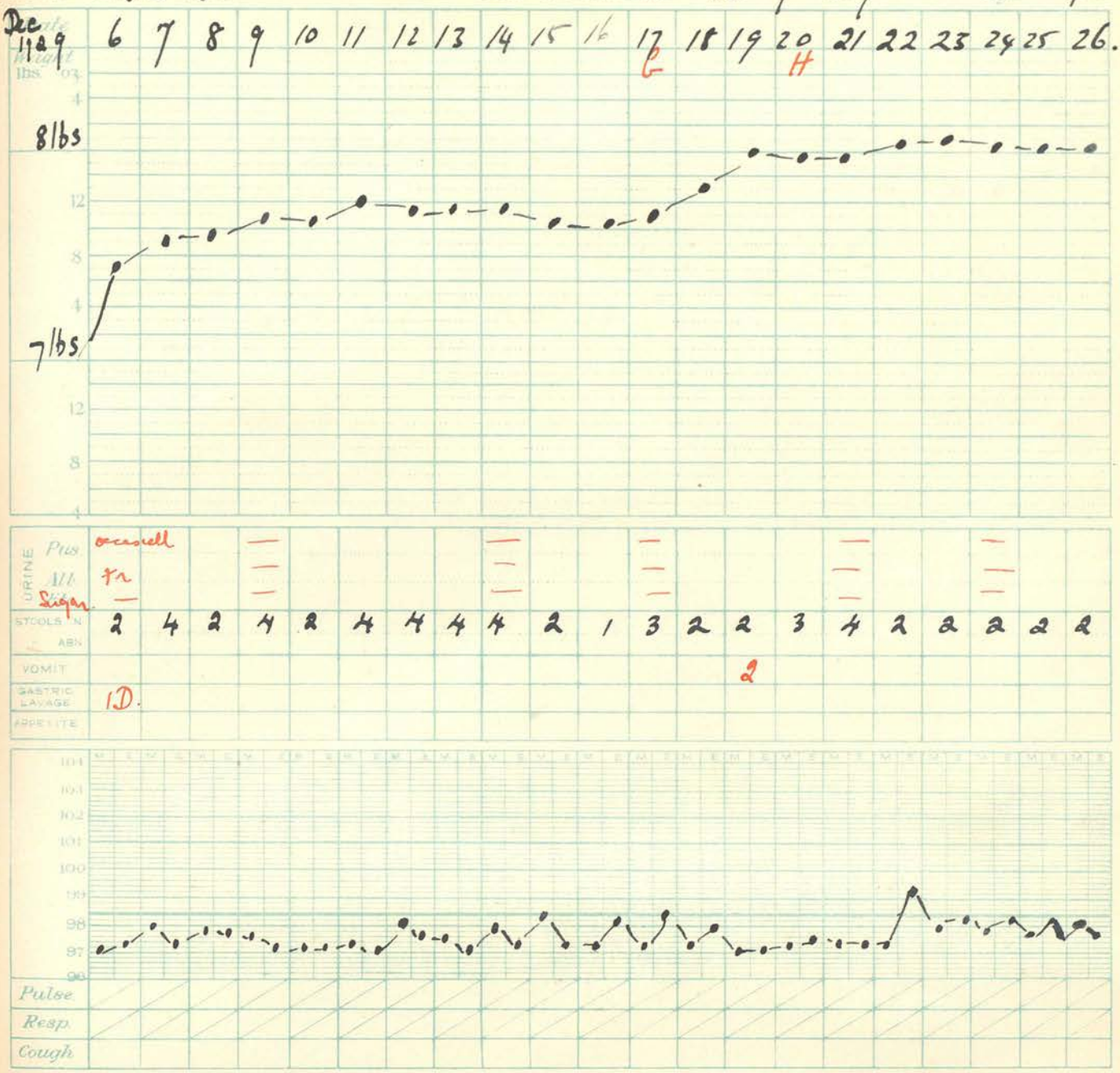

NOTES ON FEEDING

26.11.33.
F. Add. 2½ Sister Laura.

TREATMENT

THE BABIES' HOSPITAL NEWCASTLE

Name Elsie B. Date of Admission 13·9·29 Age 4½ months




NOTES ON FEEDING

17·12·33. C No 4 7½ ʃ 30 ozs.
Vegetable soup.

20·12·33 H. No 6 | 7½ ʃ | 30 ozs.
Vegetable soup.
Farola. Cereal to feed.

TREATMENT

23·12·29
R. Pot cit : gr x t. d.s.

# THE BABIES' HOSPITAL NEWCASTLE

Name Elsie B. Date of Admission 13.9.29 Age 4 3/4 months

Dec 1929 27 28 29 30 31 Jan 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Weight lbs. 4 12 8 4 8/lbs. 12 8 4

URINE Pus. Alb. Sugar

STOOLS N 2 2 2 2 2 2 3 3 2 2 2 2 1 2 2 2 1 1 2 2 2

ABN

VOMIT

GASTRIC LAVAGE

APPETITE

Temp. M E M E M E

# THE BABIES' HOSPITAL NEWCASTLE

Name Elsie B. Date of Admission 13.9.29 Age 5½ mths.

| Date | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|---|---|---|
| Jan 1930 | | | | | | | | | |
| Weight lbs. 03 | | | | | | | | | |
| 9/6s | | | | | | | | | |
| URINE Pus. | occasnl | | | occasnl | | | | occasnl | |
| Alb. | — | | | — | | | | — | |
| Sugar | — | | | — | | | | — | |
| STOOLS N | 2 | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 2 |
| ABN | | | | | | | | | |
| VOMIT | | | | | | | | | |
| GASTRIC LAVAGE | | | | | | | | | |
| APPETITE | | | | | | | | | |

104 103 102 101 100 99 98 97 96

Pulse

Resp.

Cough

NOTES ON FEEDING

No 6: 7½ : 30 ozs 5 feeds.
+ Cereal ½ oz.
+ Vegetable soup 2 ozs.

TREATMENT

# C A S E VIII.

Name: Elsie B.

Age on Admission: 6 weeks.

Admitted: 13-9-29.

Reasons for Admission:

I. Not gaining weight.

II. Covered with spots.

Family History:

Mother aged 24 years. Alive and well.

Father aged 28 years. Alive and well.

No T.B. in family.

1 other child aged 5 years. Well.

1 miscarriage.

Present History:

A healthy born baby. Full term. Normal birth.

Weight at birth - 8 lbs. 2½ ozs.

Breast fed for 14 days. Vomited after very feed.

Stated to be projectile for 1st fortnight. Then

fed on Ambrosia. Still sick, but not projectile or

less so: constipated since birth.

Melaena 12-9-29.

Covered with spots for 3 weeks.

Examination:

A very under-nourished thin baby. Wasted - hungry and crying.

Skin: Rash over face, limbs and lower abdomen.

Chest: Heart & lungs - nothing abnormal to report.

Abdomen: Not distended. No splenic or hepatic enlargement.

Ears, nose, throat - nil.

Bowels: green - at other times normal.

Feeds : taken well.

7-10-29:
Skin sepsis cleared. Doing very well.

Bowels regular. No cough. Taking feeds well.

17-10-29:
Vomiting and coughing for few days.

On Examination:

Patch of broncho-pneumonia on right side.

Has had albumen in urine - faint trace on occasions.

18-10-29: Urine: microscopically pus in fair amount.

21-10-29: Urine: No pus present.

Cough less. Tuberculin tested.

28-10-29: No vomiting. Much improved.

Weight stationary. Coughing still. Tuberculin - negative.

4-11-29: At a standstill.

On examination of chest a few general crepitations are heard - a general bronchitis. However, greatly improving.

14-11-29: Weight still at a standstill.
No physical signs of any consequence.
Urine: nil. No pus.
Child looks very much better and is standing the general infection re. lungs and kidneys well.

28-12-29: Gaining very slowly. Occasional vomits and coughing.

Out Patient's Report:

10-1-30: Very fit. gaining weight. No sickness.

3-3-30: Weight: 9 lbs 2 ozs.
Not gaining. Taking feeds but vomits after each feed.
Vegetable broth - 2 teaspoonfuls twice a week.
Farola given.

12-3-30: Weight: 10 lbs 5 ozs.
Getting Glaxo.

5-5-30: Gaining. Still sick after every feed.
Weight: 11 lbs 12 ozs.
Has had a skin rash.

Case seen by me on 22-7-33 - 4 years after hospital treatment and record of case given below:-
Child aged 4 years. General appearance - a healthy well nourished child of average size and height for her age. The complexion is good - mucous membranes present little pallor.
The mental condition is excellent - child is interested in everything. Bright, intelligent and playful.

All the teeth have erupted and are in good condition.

There is no aural, nasal, or ocular discharge.

The tonsils are pale, smooth, and not enlarged.

There is no evidence of glandular enlargement in cervical region.

The chest is well covered.

Heart: Apex beat. 4th intercostal space.

There are no mumurs. The sounds are closed and pure in all areas.

Lungs: Good air expansion.

No dullness on percussion. Note is resonant throughout both sides. Breathing puerile and no accompaniments.

Abdomen: Moves freely with Respiration.

No hyperaesthesia of skin. No splenic or hepatic enlargement. Kidneys are not palpable.

Central Nervous System: Pupils are equal: circular. react to light and to accommodation.

Knee jerks are equal and brisk on both sides.

Abdominal reflexes present and equal on both sides.

Bowels - regular, normal.

There are no rachitic manifestations anywhere.

Haemoglobin 67% .

The Mother reports that since discharge from hospital 4 years ago, child has steadily progressed and has never had any illness of any kind whatsoever.

## S U M M A R Y  of  C A S E VIII.

This is a case of an under-nourished, small baby with skin rash at 6 weeks - later followed by a chest affection in form of a pneumonic patch.
Intermittent pyuria and gastrointestinal upset were observed as well.
There was no history of contamination at birth in form of difficult labour, and no history of puerpal sepsis was given here.

# C A S E  IX.

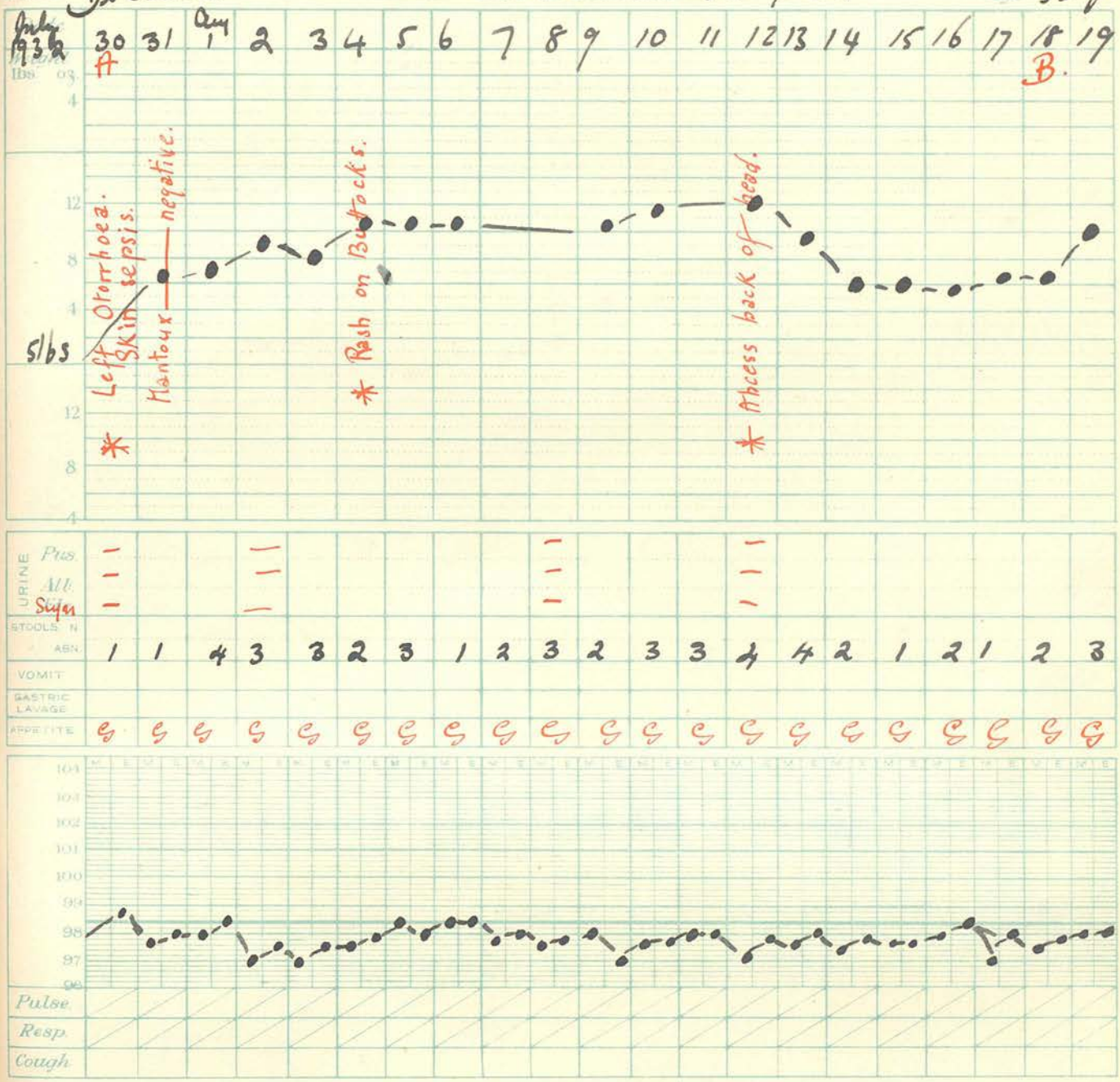
Chart 9c.

Chart 9c

Page 1.

THE BABIES' HOSPITAL NEWCASTLE

Name Doreen T. Date of Admission 30·7·32 Age 6/52 yrs.




NOTES ON FEEDING

A.

30.7.32 Ostermilk 28 ozs.

18.7.32 Cow & gate (skimmed milk) 28 ozs.

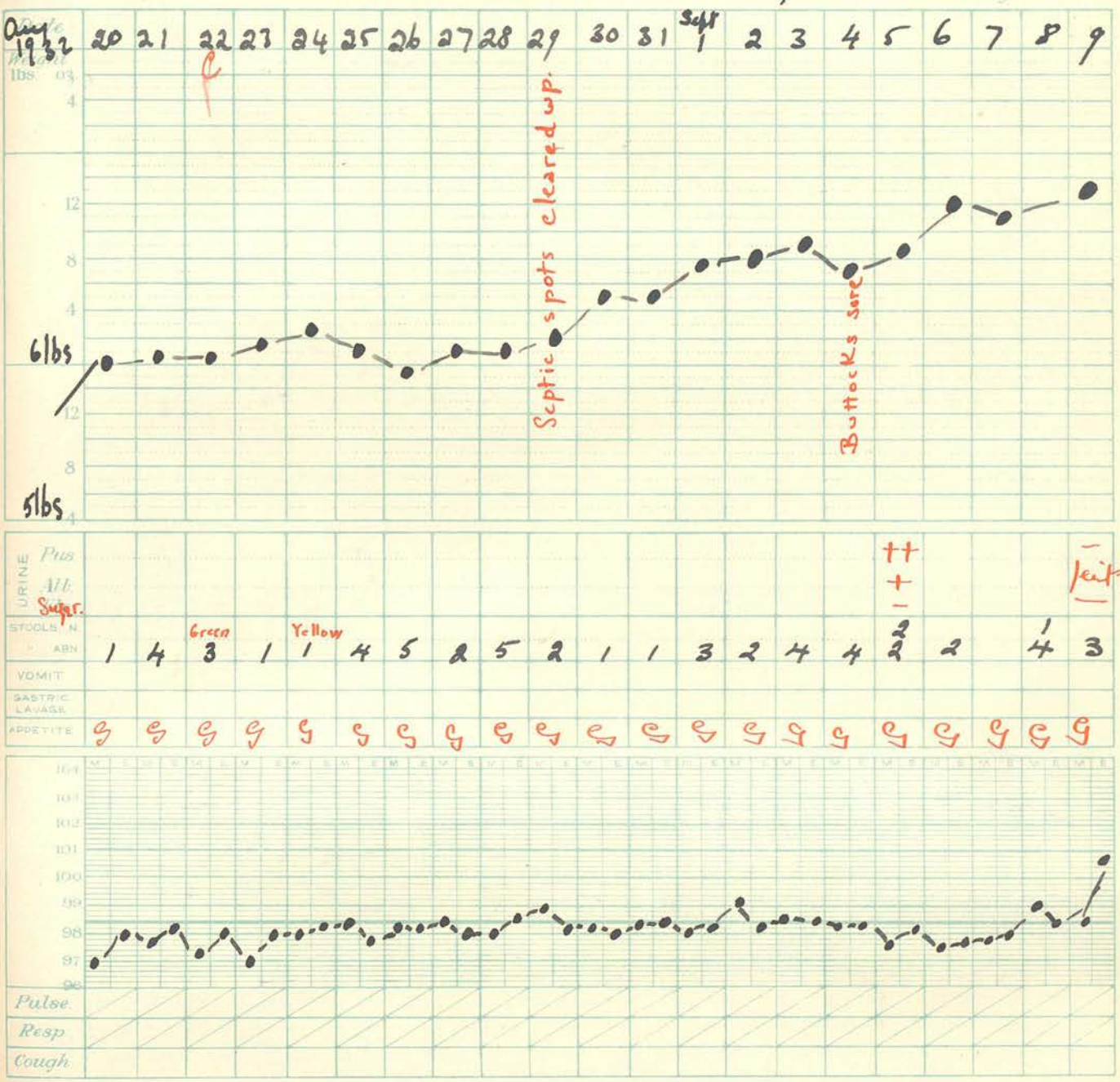
B.

TREATMENT

Paint spots with Iodine.

# THE BABIES' HOSPITAL NEWCASTLE

Name Doreen T. Date of Admission 30.7.32 Age 3½ mths.




NOTES ON FEEDING

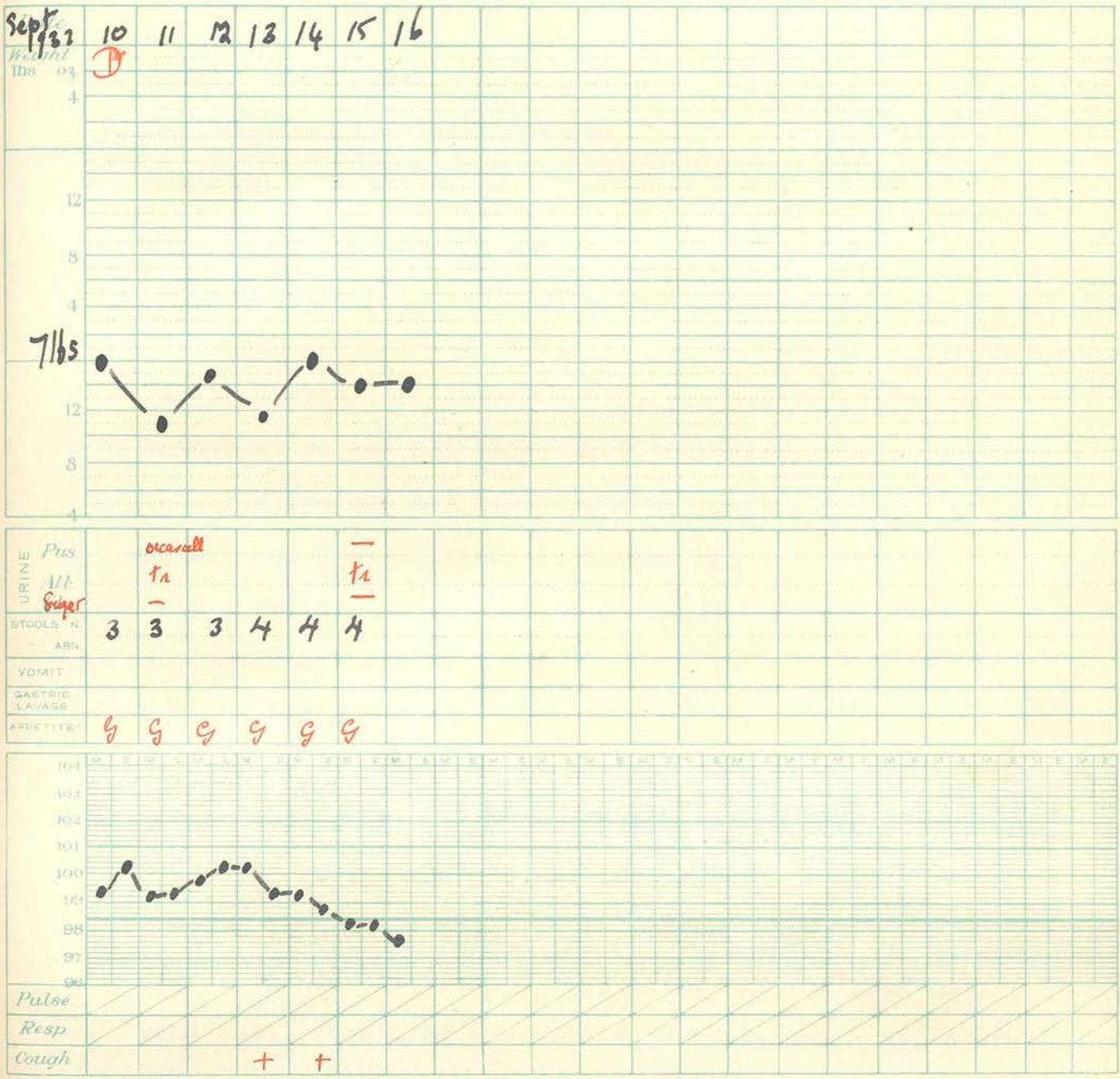
C 22.8.32.
Cow & Gate (skimmed) 35ozs.

TREATMENT

Cod liver oil mv daily.
7.9.32 Mist Pot Cit zi 4hrly.

# THE BABIES' HOSPITAL NEWCASTLE

Name Doreen T. Date of Admission 30. 7. 32 Age 4 mths.




NOTES ON FEEDING

D. 10.10.32 Cowsgate (skimmed) 30 ozs : 6 feeds

TREATMENT

# C A S E  IX.

Name: Doreen T.

Age on Admission: 2½ months.

Admitted: 30-7-32.

Reasons for Admission:

I. Discharging ear - left side.

II. Skin sepsis.

Family History:

Father alive and healthy. Aged 26 years.

Mother alive and healthy. Aged 26 years.

Mother had a miscarriage 14 months ago.

Only 1 child.

No family history of T.B.

Present History:

1st child. Not weighed at birth. Week after birth - weight was 5½ lbs. Labour difficult - lasted 2 days. Delivered by instruments and chloroform. Puerperium - 3 weeks in bed . Temperature 103° at times.

Baby commenced to vomit 7 days after birth - gradually gone back. Vomiting projectile in character - not every day - nor after every feed. Trouble with flatulence and eructation.

Bowels are constipated.

Infant very restless and cries a good deal.

Feeding: Breast fed for 14 days. Baby too weak to suck. Breast milk left mother and for past 5 weeks baby was fed on Glaxo.

Admitted at first when 7 weeks old.

Examination at this time revealed following:-

Poor baby - thin - emaciated. Eyes not sunken.

Marked loss of subcutaneous fat.

Buttocks very red also vulva.

No glands seen anywhere: Fontanelle open. Mouth clean.

No skin sepsis at this time. No cough.

Heart: nil.

Chest: nil.

Abdomen: no liver; no spleen felt.

Marked gastric peristalsis seen travelling from left to right across epigastrium. Tumour felt.

Central Nervous System: Nil.

Pyloric Stenosis diagnosed. Child operated on 1-7-32.

Given 1/3rd grain Nembutal - followed by novacain infiltration. Rammstead's operation carried out.

Weight on admission for operation - 4 lbs. 10 ozs.

1-7-32: Weight: 5 lbs.

4-7-32: 2 ozs. gain in weight since operation.

7-7-32: Progressing favourably.

15-7-32: Discharged weighing 5 lbs. 12 ozs.

Admitted on 30-7-32 because of Otorrhoea and Skin Sepsis.

Examination: Child small, puny, white and pale.

Not dehydrated, but little subcutaneous fat.

Fontanelle open - not bulging.

Glands found in both groins.

Septic sores on head and neck.

No signs of gross anaemia. Mantoux negative.

No cough. No vomiting. Bowels regular.

Wound well healed.

Abdomen: No splenic or hepatic enlargement.

Chest: nil.

Heart: nil.

Central Nervous System: Normal.

12-8-32: Child poor. Skin still septic. Fairly large abscess on back of head.

No chest symptoms.

Urine clear.

22-8-32: Child improving. No development of any more spots. Taking feeds well. Bowels relaxed and green.

Taking Cow & Gate Skimmed Milk.

29-8-32: Septic spots cleared up. Feeding well.

Gaining weight. Stools relaxed.

General condition - improving.

1-9-32: Slight progress.

4-8-33:

Child seen by me - aged 1 year 3 months.

A happy well nourished infant. Very pale complexion.

Anterior fontanelle admits tips of 2 fingers.

There is no skin sepsis. No aural or nasal discharge.

Lower central incisors are erupting.

Mouth clean - Tongue moist and clean.

There are no glands palpable in neck, axillae, or groins.

Chest: Heart: Apex beat 4th interspace.

There are no mumurs. Sounds closed and pure in both areas.

Lungs: Good expansions. Percussion note resonant on both sides. Puerile breathing and no accompaniments.

Abdomen: No splenic or hepatic enlargement.

Urine: clear - no pus, albumen or sugar.

Stools: normal, yellow in colour.

Central Nervous System: Knee jerks present and equal on both sides. Abdominal reflexes present and equal.

There are no rachitic signs to be found.

Haemoglobin 57% on 4-8-33.

## S U M M A R Y of C A S E IX.

A "marasmic" looking infant with evidence of skin sepsis and otorrhoea at 2½ months old. Other septic manifestations were abscess on head and occasional pyuria.

The Mother gave a definite history of puerpal sepsis in this case.

C A S E X.

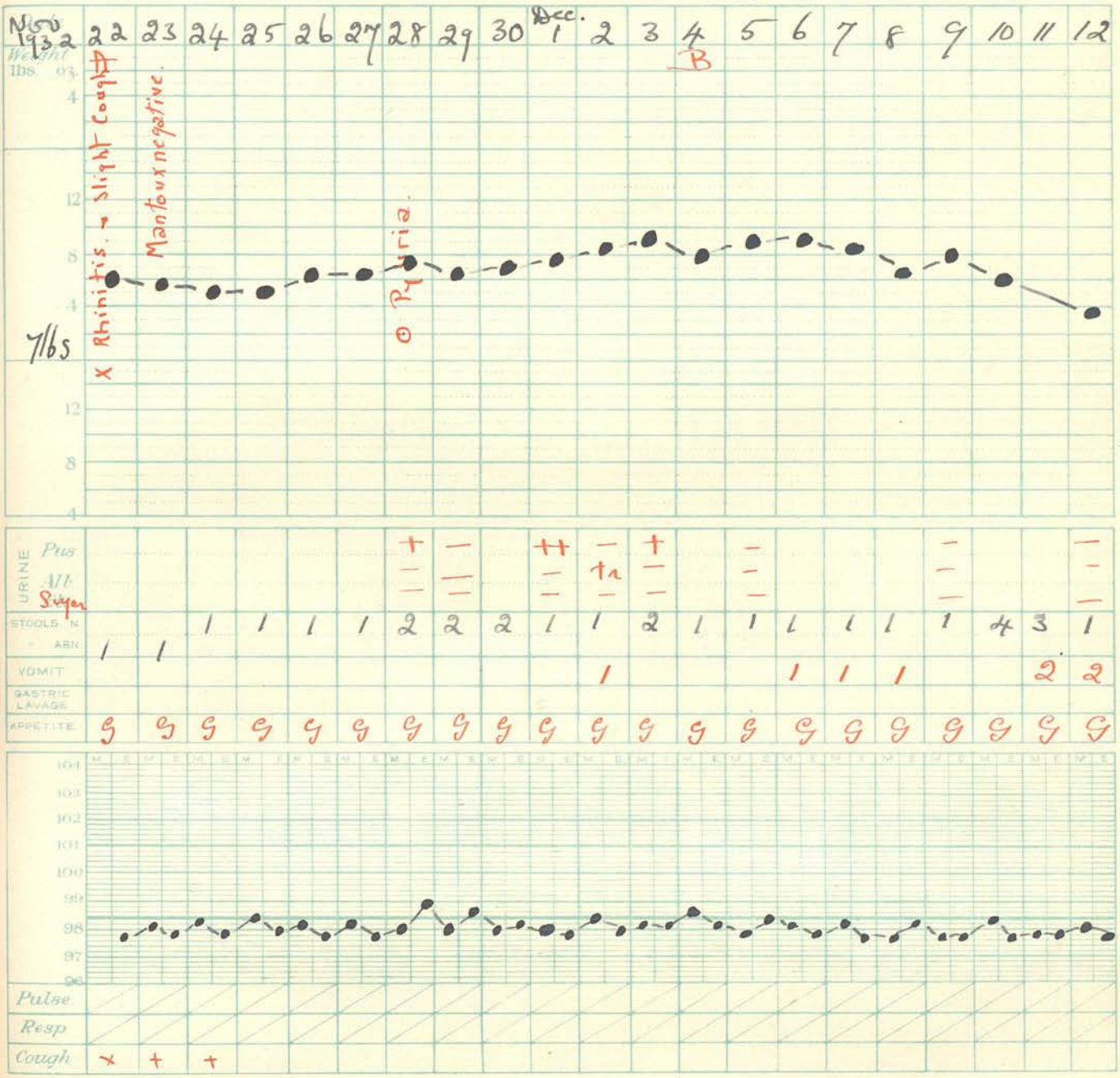
CHART 10c.

Chart 10c.

Page 1.

THE BABIES' HOSPITAL NEWCASTLE

Name Joan B. Date of Admission 22.11.32 Age 3/12 yrs.




NOTES ON FEEDING

22.11.32 A. No 4. 7½ ℥ 28 ozs. 7 feeds.

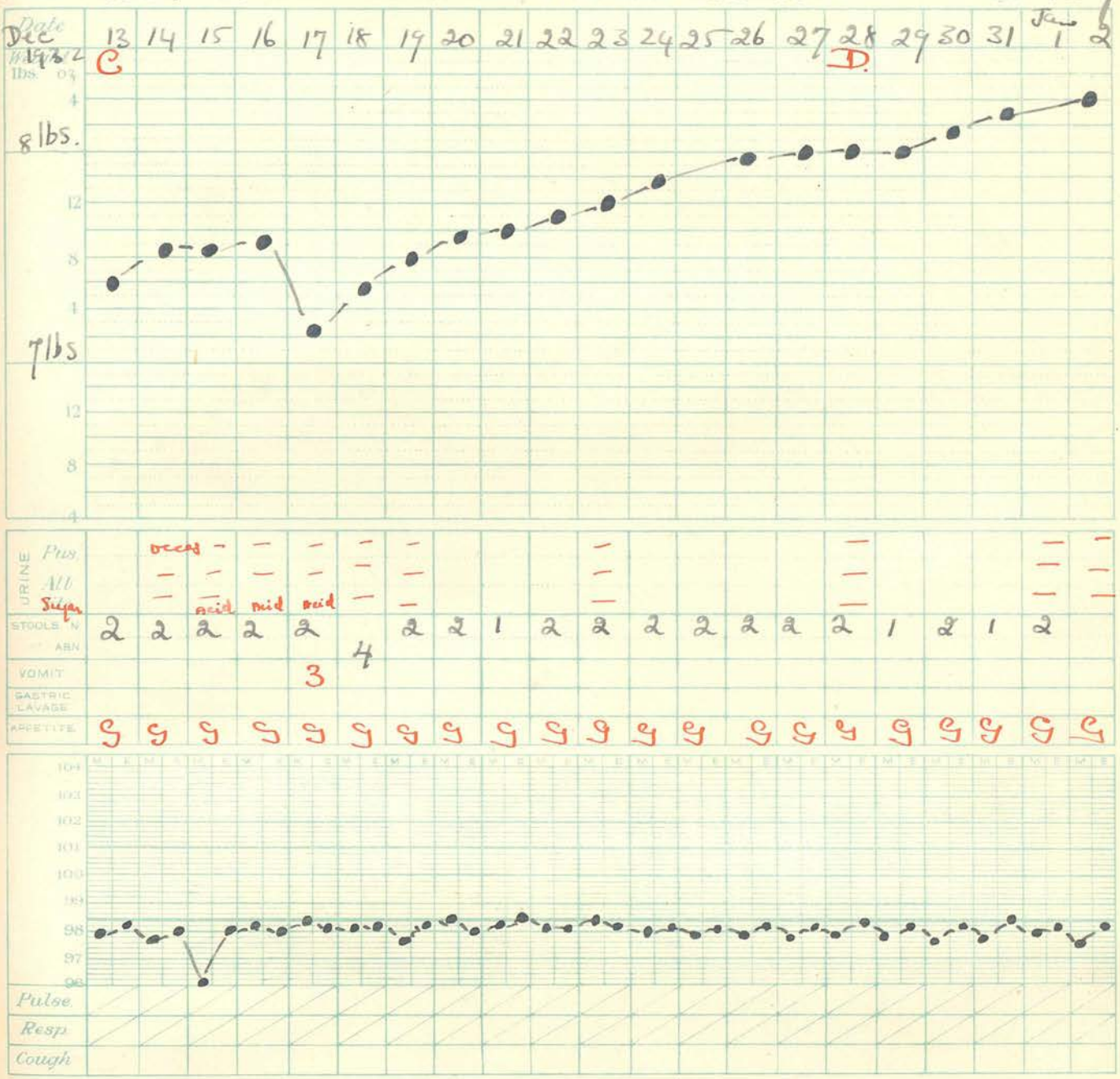
4.12.32 B. Butter flour mixture 2 ozs.

No 3 7½ ℥ 28 ozs 7 feeds.

TREATMENT

THE BABIES' HOSPITAL NEWCASTLE

Name Joan B. Date of Admission 22·11·32 Age 3/12 yrs.




NOTES ON FEEDING

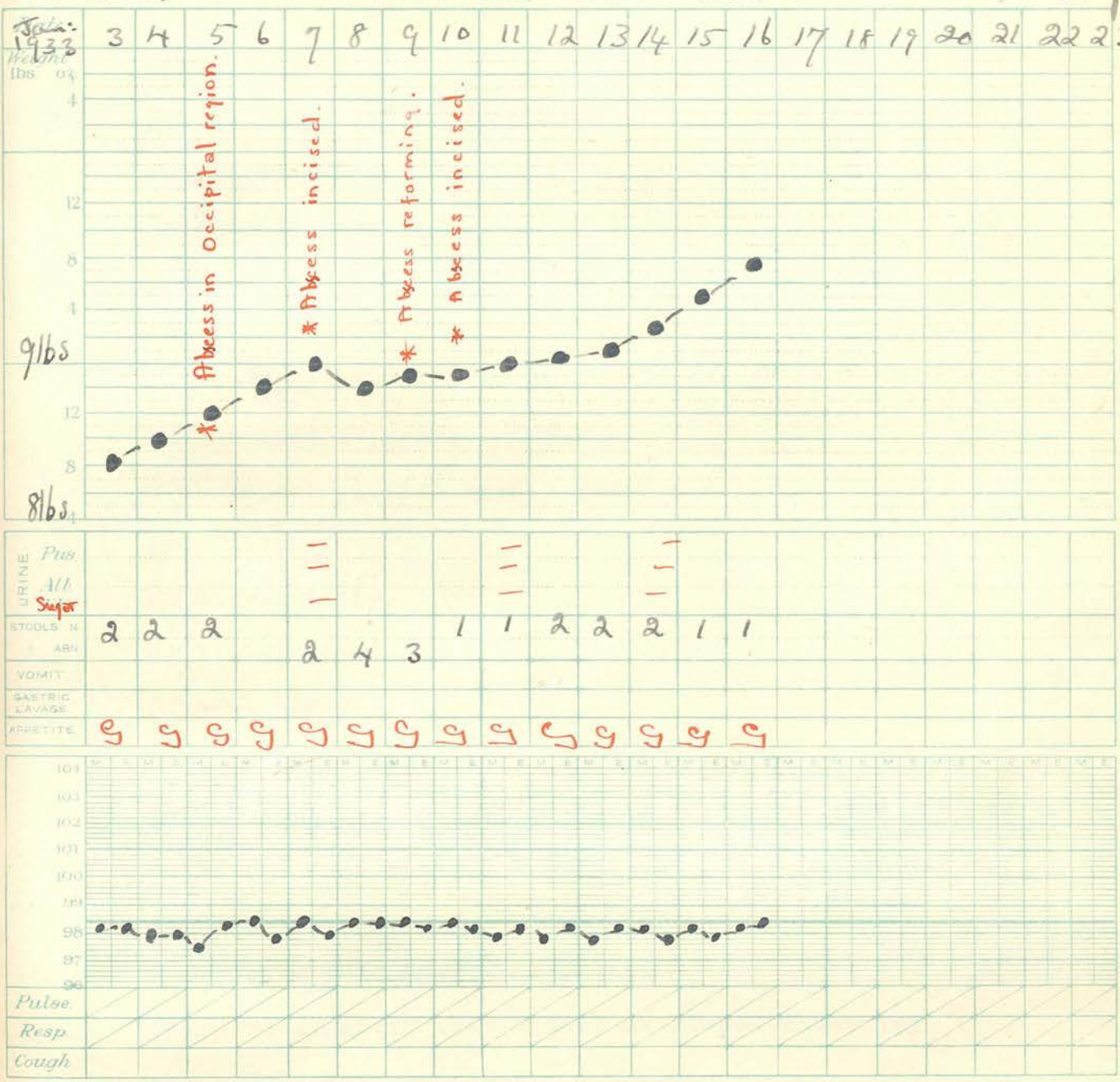
13·12·32 C No 4 7½ ℥ 30 ozs + Lactic acid: 7 feeds.

28·12·32 D. No 4 7½ ℥ 30 ozs + Farex to 2 feeds.

TREATMENT

# THE BABIES' HOSPITAL NEWCASTLE

Name Joan B. Date of Admission 22.11.32 Age 5/12 yrs.




NOTES ON FEEDING

TREATMENT

# C A S E X.

Name: Joan B.

Age on Admission: 3 months.

Admitted: 22-11-32.

Reason for admission:

I. Not thriving.

Family History:

Mother aged 24 years. Healthy.

Father aged 27 years. Healthy.

3 children: 1 girl aged 4 years : well

and twins.

No miscarriages.

No T.B. in family.

Present History:

Healthy; full time baby. Weighed 7½ lbs.

Normal labour. Breast fed for a fortnight, then Mother developed abscesses on breasts and unable to continue feeding.

Puerperium: 14 days: no fever.

Immediately after this Mother developed white leg and also breast abscesses.

Infant was then put on to Nestle's milk - followed by Cow & Gate- they whey - then Ambrosia.

Baby vomits frequently - almost every bottle.

Bowels regular: 2 normal motions per day.

Has a cough at present.

No skin sepsis - no fits.

Examination:

A thin but well developed baby.

Anterior Fontanelle patent - admits 3 finger tips - not depressed. Baby smiles and appears bright.

No skin sepsis.

Mucoid secretion present from nasopharynx.

Mouth clean. No inflammation in throat.

No glands palpable.

Abdomen: Slightly protuberant - but there is nothing to be felt in nature of glands. Spleen not palpable. Liver is not enlarged.

Chest: Good expansion - good air entry.

No adventitious sounds.

Heart: No hypertrophy. No murmurs. Sounds closed and pure.

Central Nervous System: Knee jerks present and equal.

Feed A; 28 ozs. 7½% sugar. 7 feeds.

Is taking feeds well. Inclined to ruminate.

23-11-32: Mantoux negative.

25-11-32: Baby is taking feeds well, but as yet no gain in weight.

28-11-32: Urine. Microscopically pus, no albumen no sugar.

Stools - 2 per day. normal.

1-12-32: Urine: Microscopically - pus more marked.

21-12-32: Baby has vomited whole of one feed.

Stools normal - 1 per day.

Urine: Microscopically no pus, albumen or sugar.

3-12-32: Weight is commencing to go up.

4-12-32: Feed B. Butter, flour mixture : 2 ozs.

Feed No.3. 7½% sugar, 28 ozs. 7 feeds.

6-12-32:- 8-12-32: Baby has vomited since commencement of butter flour mixture.

9-12-32: - 11-12-32: Urine: Microscopically clear.

Stools normal: more frequent than before.

Weight has dropped slightly.

Butter flour mixture has been discontinued.

13-12-32: Lactic acid milk given 30 ozs. 7 feeds

7½% sugar.

14-12-32 - 16-12-32: Weight is steadily going up.

17-12-32: Weight has dropped and baby has recommenced vomiting. There have been 3 vomits today.

19-12-32: 4 relaxed, yellow motions.

19-12-32:-28-12-32: Weight is becoming markedly improved. There is a daily steady gain.

28-12-32: Feed No.4. 30 ozs. given with Farex to 2 of the feeds.

Progress has been well maintained.

5-1-33: Baby has developed a small abscess in the occipital region - about the size of a shilling piece.

7-1-33: The abscess has been incised and is discharging a small quantity of pus.

8-1-33: Abscess drying up.

9-1-33: More inflammation has set in and abscess has reformed.

10-1-33: Abscess has been reincised and small quantity of pus has exuded.

Seen by me as an Out Patient on 8-8-33. 1 year old. Mother reports that baby has been fairly well except for Whooping Cough, from which it has recovered satisfactorily.

A fair sized, bright baby for its age - with flabby musculature.

Head is not bossed.

Anterior Fontanelle admits 2 fingers.

There is no evidence of skin sepsis.

Mouth clean - tongue moist and clean.

Fauces clear.

No glands palpable in neck in anterior or posterior cervical triangles.

Chest: Mucous membranes very pale.

Heart: No murmurs. Sounds closed and pure in all areas.

Lungs: Good air entry. Sounds puerile - few accompanying rhonchi still present.

Abdomen: Rather protuberant: no splenic or hepatic enlargement.

Urine: Microscopically clear - no pus, albumen or sugar.

Some rachitic manifestations in lower limbs:

Left tibia is bowed, right tibia very slightly bowed.

Slight rib beading.

No enlargement of radial epiphysis.

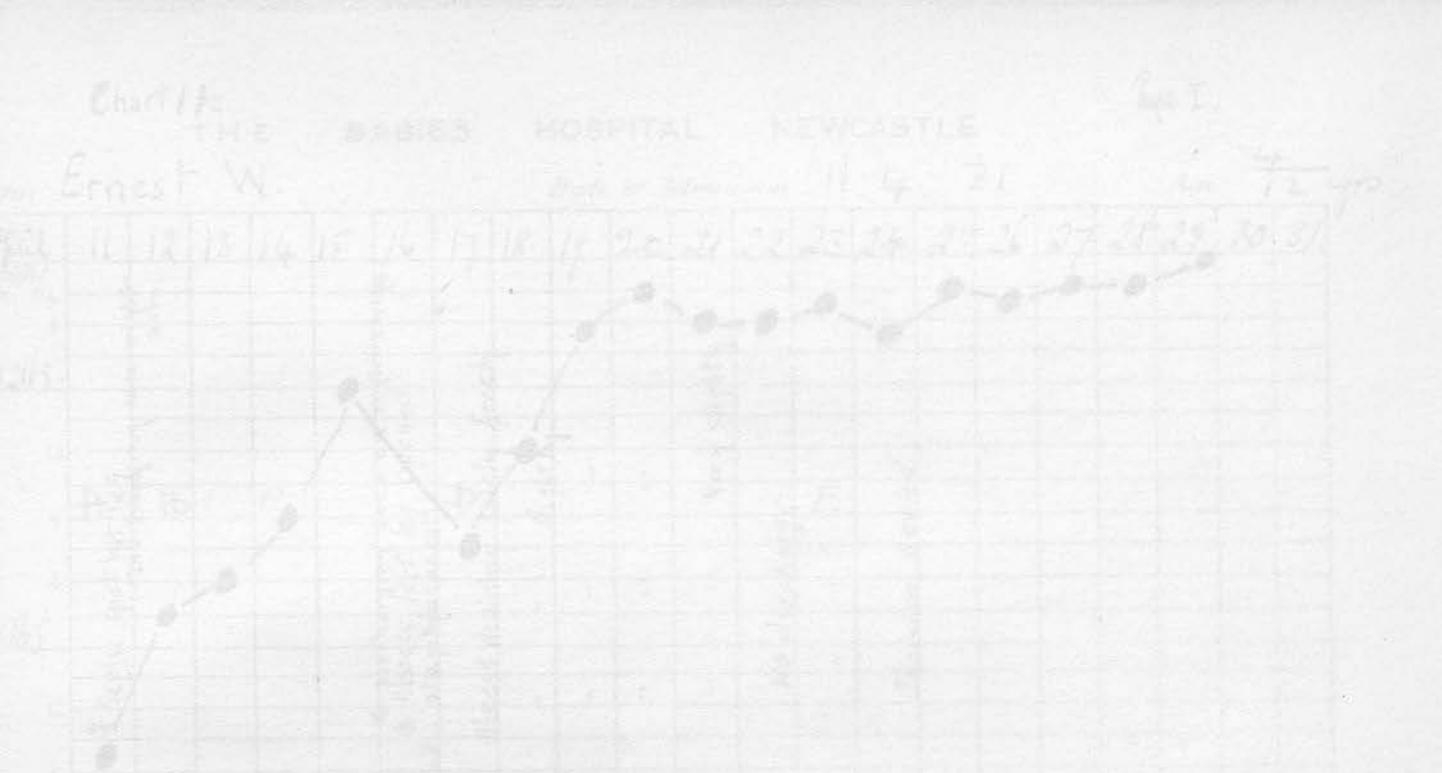
Haemoglobin 58%

Put on to mixture Ferri et ammon. cit. grs.V. t.i.d.

## S U M M A R Y of C A S E X.

A small, undersized baby for its age, with rhinitis, pyuria, difficulty in feeding. After comparatively good progress, gain in weight, clear urine, abscess formation commenced. However, weight was well maintained, also resistence to infection.

Mother did not give a history of puerpal sepsis, but there was a very obvious septic process present and abscess formation occurred in both breasts 14 days after delivery.



C A S E XI

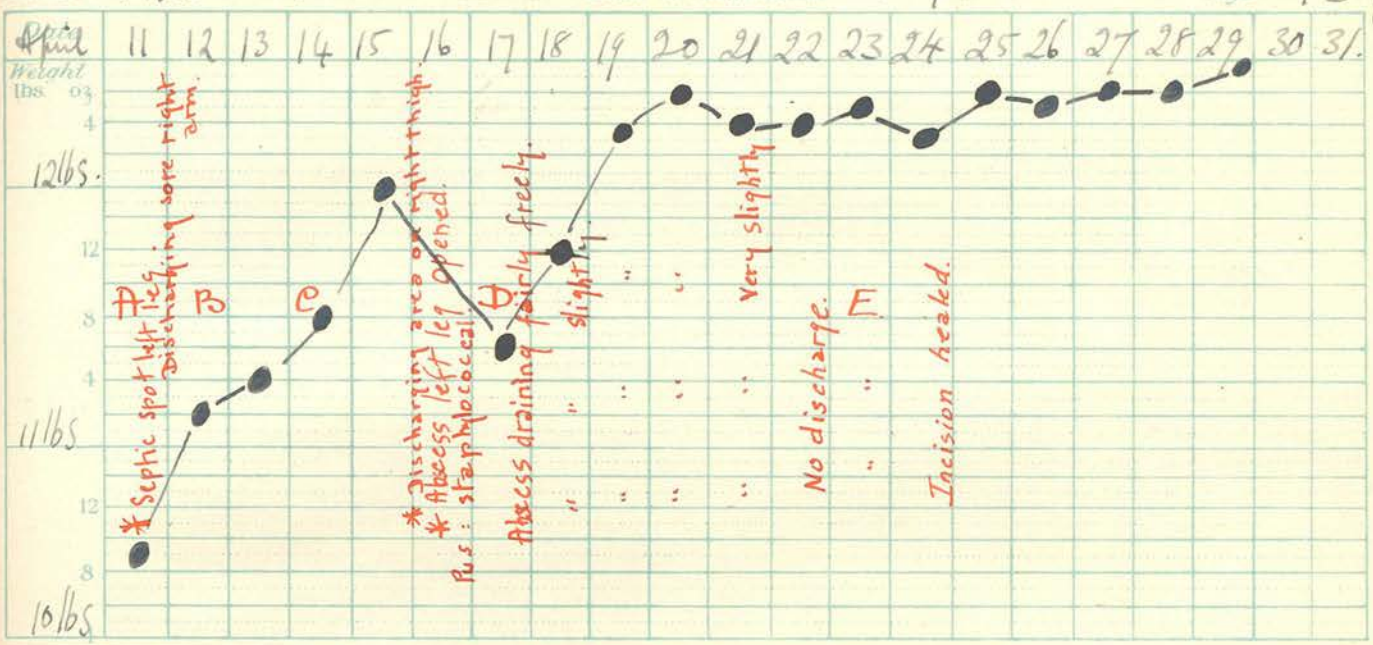
CHART 10c.

Chart 1/c.

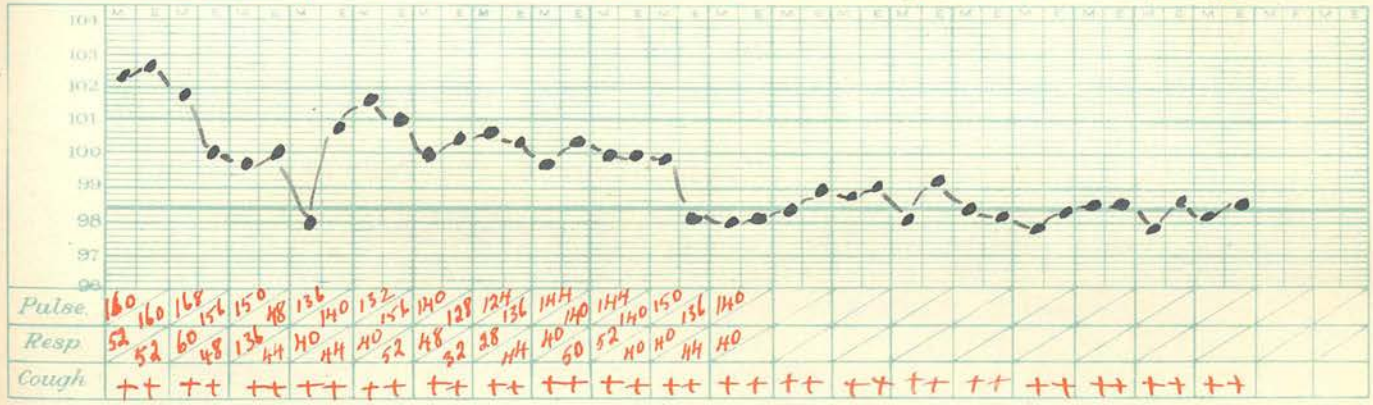
Page I.

THE BABIES' HOSPITAL NEWCASTLE

Name Ernest W. Date of Admission 11·4·31 Age 4/12 yrs.




| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| URINE Pres. | 1 | | | | | | | | | 1 | | | | – | | | – | | | | |
| Alb. | 1 | | | | | | | | | 1 | | | | – | | | – | | | | |
| Sug. | 1 | | | | | | | | | 1 | | | | – | | | – | | | | |
| STOOLS N. | | 1 | 1 | 0 | 3 | 2 | 2 | 1 | 2 | 4 | 4 | 4 | 3 | 2 | 1 | 2 | 4 | 4 | | | |
| ABN. | | | | | | | | | | | | | | | | | | | | | |
| VOMIT | | | | | | | 1 | 2 | | | | | | | | | 1 | | | | |
| GASTRIC LAVAGE | | | | | | | | | | | | | | | | | | | | | |
| APPETITE | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | G | | |




| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pulse | 160 | 160 | 168 | 156 | 150 | 148 | 136 | 140 | 132 | 156 | 140 | 128 | 124 | 136 | 144 | 140 | 144 | 140 | 150 | 156 | 140 |
| Resp | 52 | 52 | 60 | 48 | 136 | 44 | 40 | 44 | 40 | 52 | 48 | 52 | 28 | 44 | 40 | 60 | 52 | 40 | 40 | 44 | 40 |
| Cough | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ |

NOTES ON FEEDING

11·4·31
Feed A. No 2. 7½ 28 ozs.
½ strength saline 5% glucose between feeds.

12·4·31. Feed B. No 3 7½ 30 ozs.

14·4·31. Feed C. No 4 7½ 30 ozs. add Sister Laura's food.
Vegetable soup.
Orange juice.

17·4·31. Feed D. No 6 : 7½ etc.

23·4·31. Feed E. whole milk 30 ozs. Add milk Pudding & Vegetable soup.

TREATMENT

11/4/31. Brandy m v 4 hrly.
12/4/31. Brandy m v T.D.S.
– 13/4/31.
Ferromalt m v in 3 feeds.

# C A S E XI.

Name: Ernest W.

Age on Admission: 4 months.

Admitted: 11-4-31.

Reasons for Admission:

I. Diarrhoea.

II. Vomiting.

Family History:

Mother alive and well.

Father alive and well.

6 children: 5 living - healthy.

1 died of bronchitis aged 10 months.

Father's father and sister died of Tuberculosis.

Present History:

Healthy born infant. Weight at birth 8 lbs.

Natural birth. Normal puerperium.

Fed on breast for 4 weeks then on Glaxo.

Has been quite well until 3 days ago (8-4-31), when he commenced to vomit. Bowels were relaxed: stools green and slimy - no blood.

Baby has been feverish, and has lost weight in past week.

Cough troublesome.

Examination: Baby looks ill. Fontanelle is not sunken. Quite well nourished and does not appear to have lost much weight.

Skin moist: small scars from possibly septic spots on right leg. Large septic spot on left leg, hard and painful. Discharging circular sore on right arm. Active sepsis right leg.

Ears, throat, and nose normal.

Heart: nil

Lungs: resonant. Northing abnormal detected.

Abdomen: nil.

Temperature 103°.

Urine: nil

16-4-31: Has been feverish since admission.

Temperature 100°.

On anterior aspect of thigh and left side red, hard painful swelling, fluctuating in centre.

Corresponding area on right leg is discharging.

Incision made under local anaesthetic (ethyl chloride) over softest part of swelling on left thigh. Wound opened up with sinus forceps. Thick pus evacuated, a large quantity. Gauze drain inserted. Fomented 4 hourly. Slide stained by Gram's method showed staphylococcal infection.

21-4-31: General condition of baby much improved. Temperature subsiding and there is a gain in weight. Very little serous discharge from incision. Surrounding area is still hard, no oedema: no fluctuation.

25-4-31: Wound healed. Hardness subsiding.
Baby doing well.
Stools have been variable in number: 1-2 and on occasions 3 -4, but quite normal colour and consistence. Occasional vomits.
Though cough has been a prominent symptom the chest did not at any time show more than a few rhonchi.
Seen by me on 24-8-33 aged 2 years 8 months.
Mother reports that child has been well since discharge from hospital: to put it in her own words: "Has never looked back since discharge from hospital".
The head is bossed in frontal and parietal regions.
Anterior Fontanelle closed.
The child appears to be the average size for its age. Is bright, playful and intelligent.
There is no evidence of skin sepsis.
The mucous membranes do not present any degree of anæmia.
Teeth are mostly all present and in quite good condition.
Tongue moist and clean.
There are no enlarged cervical, supraclavicular axillary or groin glands.
The tonsils are smooth, pale and not enlarged.
There is no aural, nasal or eye discharge.
The muscles are hypotonic.

Chest well covered.

Heart: Apex beat.

4th interspace in the nipple line.

No murmurs. Sounds closed and pure in all areas.

The ribs show beading.

Lungs: Resonant throughout. Good air entry.

Puerile breathing and no accompaniments.

Abdomen: rather large, pot belly.

No splenic or hepatic enlargement.

Central Nervous System: Pupils circular, equal, react to light and accommodation.

Knee jerks equal on both sides and brisk.

Bony deformities: Radial and tibial epiphyses slightly enlarged. Tibiae are markedly bowed.

Haemoglobin 60%.

## S U M M A R Y of C A S E XI.

In this case a history of acute and sudden onset of vomiting and diarrhoea was given. The infant was febrile and though physical signs in chest revealed nothing, clinical picture presented a bronchopneumonia and skin sepsis in the form of abscess formation and discharging sores. Stay in hospital did not corroborate any gastrointestinal disturbance of any degree.

Recovery set in with rise in weight, clearing up of sepsis and disappearance of chest symptoms.

In this case history did not reveal a difficult labour or abnormal puerperium in Mother.

# C A S E  XII

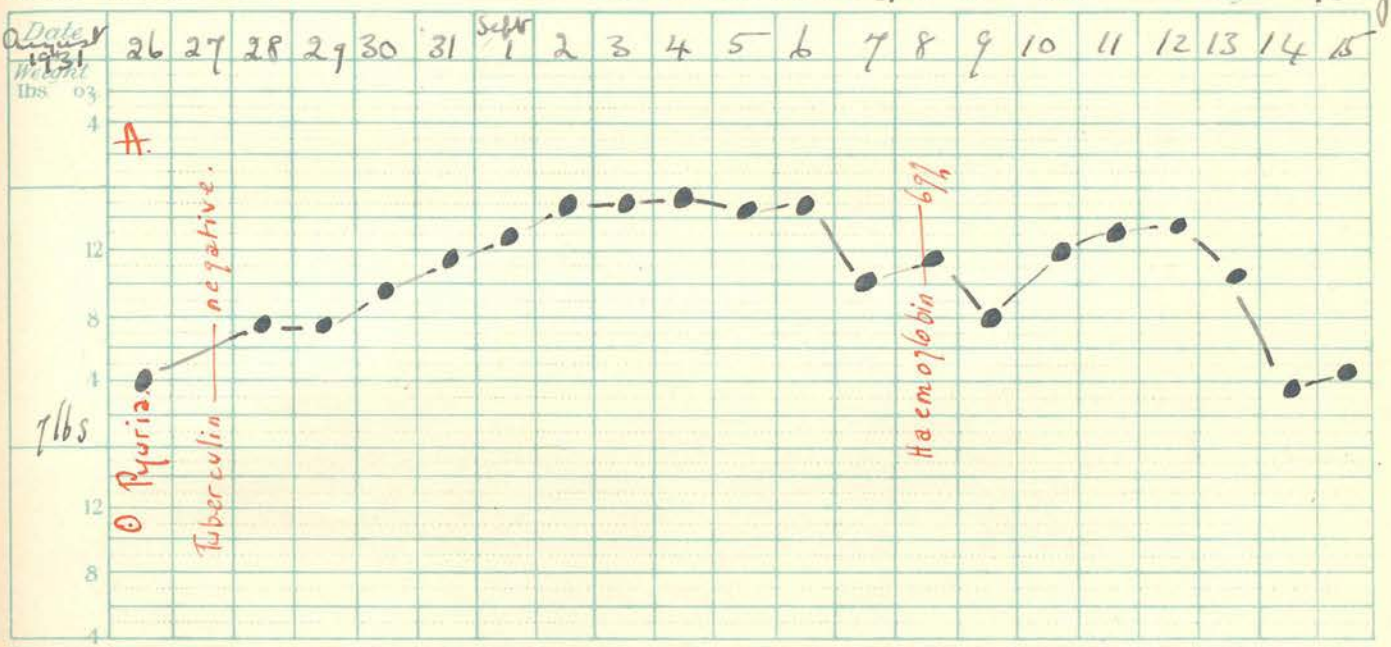
CHART 12c.

Chart 12c.

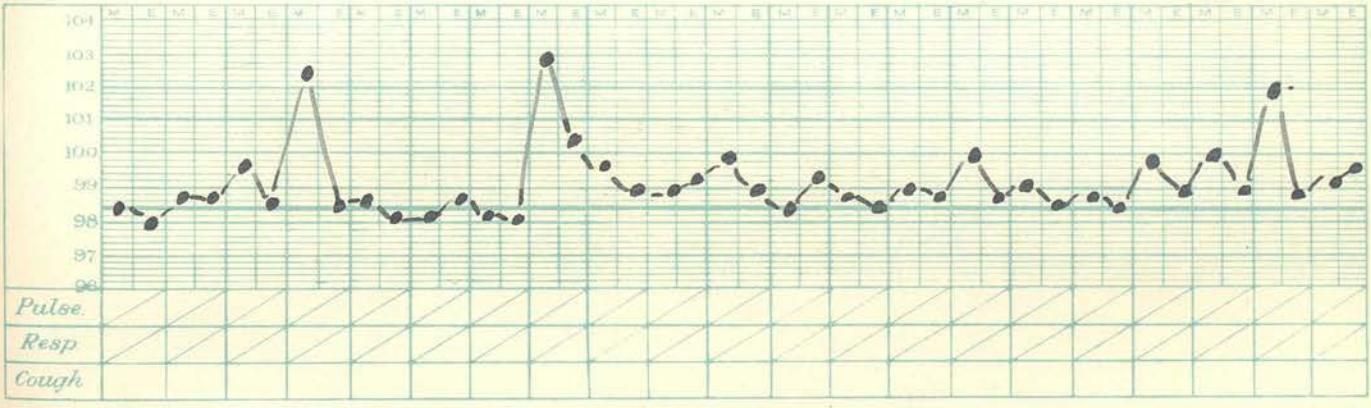
Page 1.

THE BABIES' HOSPITAL NEWCASTLE

Name Thomas P. Date of Admission 25.8.31. Age 3/12 yrs.




| | 26 | 27 | 28 | 29 | 30 | 31 | Sept 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| URINE Pus. | ++ | | ++ | | | clear | | | | clear | | | — | | | | — | | | clear | |
| Alb. | + | | ferte | | | tr | | | | — | | | + | | | | + | | | + | |
| Sugar | | | — | | | — | | | | | | | — | | | | — | | | — | |
| STOOLS N. | | | | 1 | 3 | 4 | 1 | 3 | 3 | 1 | 3 | | | | | | | | | | |
| ABN. | | 2 | 1 | | | | | | | | | 6 | 3 | 2 | 2 | 1 | 2 | 3 | 5 | 2 | 2 |
| VOMIT | | 2 | 1 | 1 | | | | | | | | | 2 | 2 | | | | 1 | 2 | | |
| GASTRIC LAVAGE | | | | | | | | | | | | | | | | | | | | | |
| APPETITE | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | F.G. | G | G | G | G | G |




NOTES ON FEEDING

A. No 4. 7½ ℥ 2 4 0 2 S : 7 feeds + Lactic acid 2T.

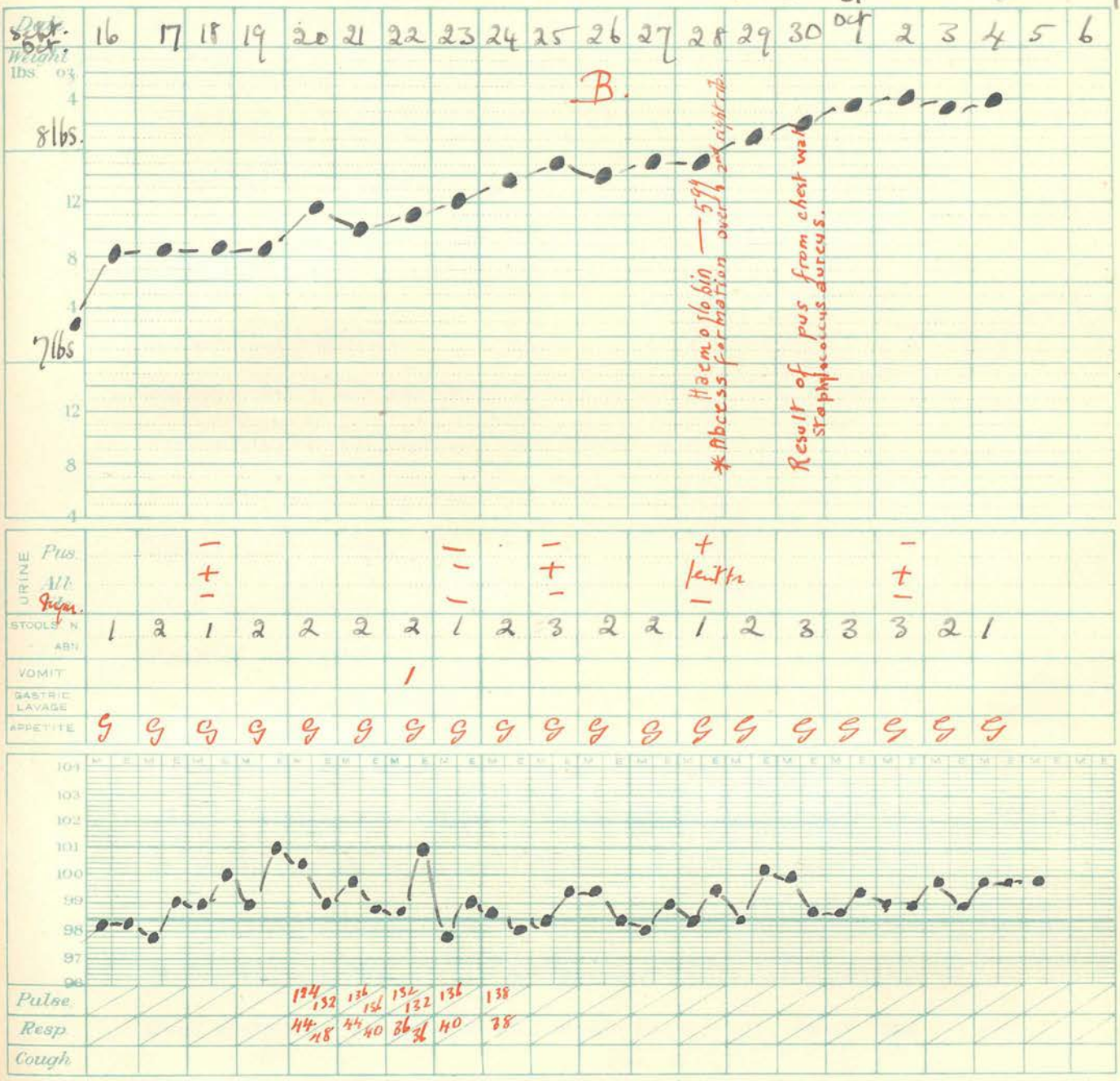
TREATMENT

Cod liver oil. 2ī daily.

℞.
Mist Ferri et ammon cit (gr vii) in day. — t.d.s

# THE BABIES' HOSPITAL NEWCASTLE

Name Thomas P. Date of Admission 25 · 8 · 31 Age 3/12 yrs.




NOTES ON FEEDING

No 4 7½ 4 2402s: 7 feeds + Lactic acid 2 t.

B. No 4 7½ 4 2402s: 6 feeds.
+ Cereal.

TREATMENT

Cod Liver oil 2 t daily.

# C A S E XII

Name: Thomas P.

Age on Admission: 3 months.

Admitted: 25-8-31.

Reasonsfor admission:

I. Losing Weight.

II. Vomiting.

Family History:

Mother aged 18 years. Well.

Father aged 22 years. Well.

No other children:

No miscarriages.

No T.B. in family.

Father unemployed.

Present History:

Full term, healthy born baby. Weighed 7 lbs. Breast fed for 3 days. Mother was confined in Princess Mary Maternity Home and baby was taken off breast because of some disease which went through hospital. (This was probably pemphigus neonatorum). Mother was sent home, but baby was kept for 5 weeks after birth.

It has never been well since then and does not appear to thrive.

Feeding: Baby was fed on Glaxo from time it left Princess Mary'sHospital till a week before admission (3 teaspoonfuls to 3 ounces $H_2O$).

Changed to Ostermilk a week ago (4 teaspoonfuls to 4 ozs. of $H_2O$).

Commenced to vomit the day before admission.

Examination: Baby looks ill, is pale and very thin. He has a fairly lusty cry and kicks a good deal.

Skin: No skin sepsis, but a few papular spots on the limbs and lower part of abdomen. These appear to be clearing up now. The skin is very lax and shows obvious signs of recent wasting.

Mouth: Nothing to note.

Throat: No septic tonsils.

Glands: No glands palpable.

Chest: Expansion good, no cough. No adventitious sounds.

Heart: No detectable enlargement. Resting rate 150 per minute.

Abdomen: Skin very relaxed - muscular development poor - nothing palpable.

Urine: Microscopically numerous pus cells present. Albumen present. No sugar.

Food given : 24 ozs. 7 feeds plus lactic acid 1 teaspoonful.

27-8-31: Mantoux negative.

28-8-31: Urine: microscopically numerous pus cells present.

Slight increase in weight.

Appetite fairly good.

29-8-31: Temperature, 102.4°.

No definite physical signs anywhere. Probably rise in temperature due to urinary condition.

1-9-31: Temperature, 103°.

Weight appears to have risen and infant fairly comfortable, despite rise in temperature.

6-9-31: 6 relaxed motions, yellow.

Weight stationary.

7-9-31: Urine: Trace of Albumen.

2 vomits. 3 relaxed motions.

8-9-31: Blood Examination:

Haemoglobin 69%

Red Blood Corpuscles: 4,150,000 per cmm.

9-9-31: Child does not appear to be so well.

Blueness seen round the mouth which comes and goes.

Vomited in the afternoon and appeared to be better after that. Has passed 1 green stool.

11-9-31: Urine: Trace of Albumen.

Microscopically nopus.

13-9-31: 5 relaxed, yellow motions.

2 vomits.

14-9-31: Rise in temperature to 102°.

Urine: Microscopically trace of albumen.

Drop in weight.

18-9-31: Child is very ill.

Respiration rapid - 50 to 60.

Breathing very rapidly. Looks very pale. Pulse 160.

20-9-31: Pulse 124: Respiration 44.

Weight has increased slightly.

Stools normal.

There are irregular little rises in Temperature up to 101°.

23-9-31: Child appears to be much better. Has now lost that blue look, which he had around the mouth.

Is gaining weight slowly.

Urine: clear.

25-9-31: Urine: Microscopically no pus present, Trace of albumen and no sugar.

26-9-31: Feed B. 24 ozs. 6 feeds plus Cereal.

28-9-31: Infant has developed an abscess over the 2nd right rib in front. This was aspirated and pus sent for examination (and later incised.) Large quantity of pus evacuated.

Haemoglobin 59%.

Pus has reappeared in urine.

30-9-31: Bacteriological report on pus from Chest abscess: Direct films show numerous staphylococci. No acid-fast (T.B.) bacilli seen. Cultures give a profuse growth of staphylococcus aureus.

Case seen by me 28-8-33. Aged 2 years 3 months.
Mother reports that child has been quite well since leaving hospital, except for occasional bronchitis.
Baby is bright, intelligent. Several teeth present and in good condition.
There are numerous spots on lower part of back, lower limbs and upper limbs. These are definitely not of a septic nature.
There is no aural or nasal discharge.
Complexion pale.
Child is of good size for his age.
There is no evidence of rachitis.
The anterior Fontanelle is closed.
Cough present, slight, wheezy.
Chest: Heart: 5th interspace. No murmurs.
Sounds rapid, and 1st sound appears accentuated at the mitral area - 2nd sound appears closed and pure.
Lungs: Note good throughout.
Harsh vesicular breath sounds and numerous accompanying rhonchi.
Abdomen: Protuberant. No splenic or hepatic enlargement.
Bowels regular. Motions normal.
Spots on body, arms and legs are irritable and have been scratched.
Haemoglobin 60%

## S U M M A R Y of C A S E XII.

This case demonstrates primary genitourinary infection, followed by gastrointestinal upsets of a mild order and finally abscess formation on chest wall - the nature of this being staphylococcal.

In this case there was a definite indication of some septic process at work in hospital - at the time of birth of the infant - at this phase infection must have lodged itself in the body and asserted itself at the age of 3 months. The puerperal history was apparently normal. At present child has bronchitis. Haemoglobin level is 60%.

C A S E  XIII.

Chart 13c.

Chart 13e.

Page 1.

# THE BABIES' HOSPITAL NEWCASTLE

Name Jean W. Date of Admission 19.7.32 Age 3½ months

July 1932 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | Aug 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

Weight lbs. oz.

A

B.

Septic spots on head.

Tuberculin — negative.

Head sepsis clearing up.

Septic spots on legs.

6lbs.

5lbs

URINE Pus. Alb. Sugar

STOOLS. N. ABN.

| | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | Aug 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STOOLS. N. | 2 | 2 | 3 | 3 | 3 | 1 | 3 | 2 | 2 | 2 | 3 | 2 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 3 | 4 |
| ABN. | | | | | | | | | | | | | | | | | | | | | |
| VOMIT | 2 | 1 | 2 | 1 | 1 | | | | | | | | | | | | | | | | |
| GASTRIC LAVAGE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | | 1 | 1 | | | | | 1 | |
| APPETITE | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A |

104 103 102 101 100 99 98 97 96

Pulse

Resp.

Cough

NOTES ON FEEDING

19.7.32 A. No 3. 7½ 24 ozs : 6 feeds

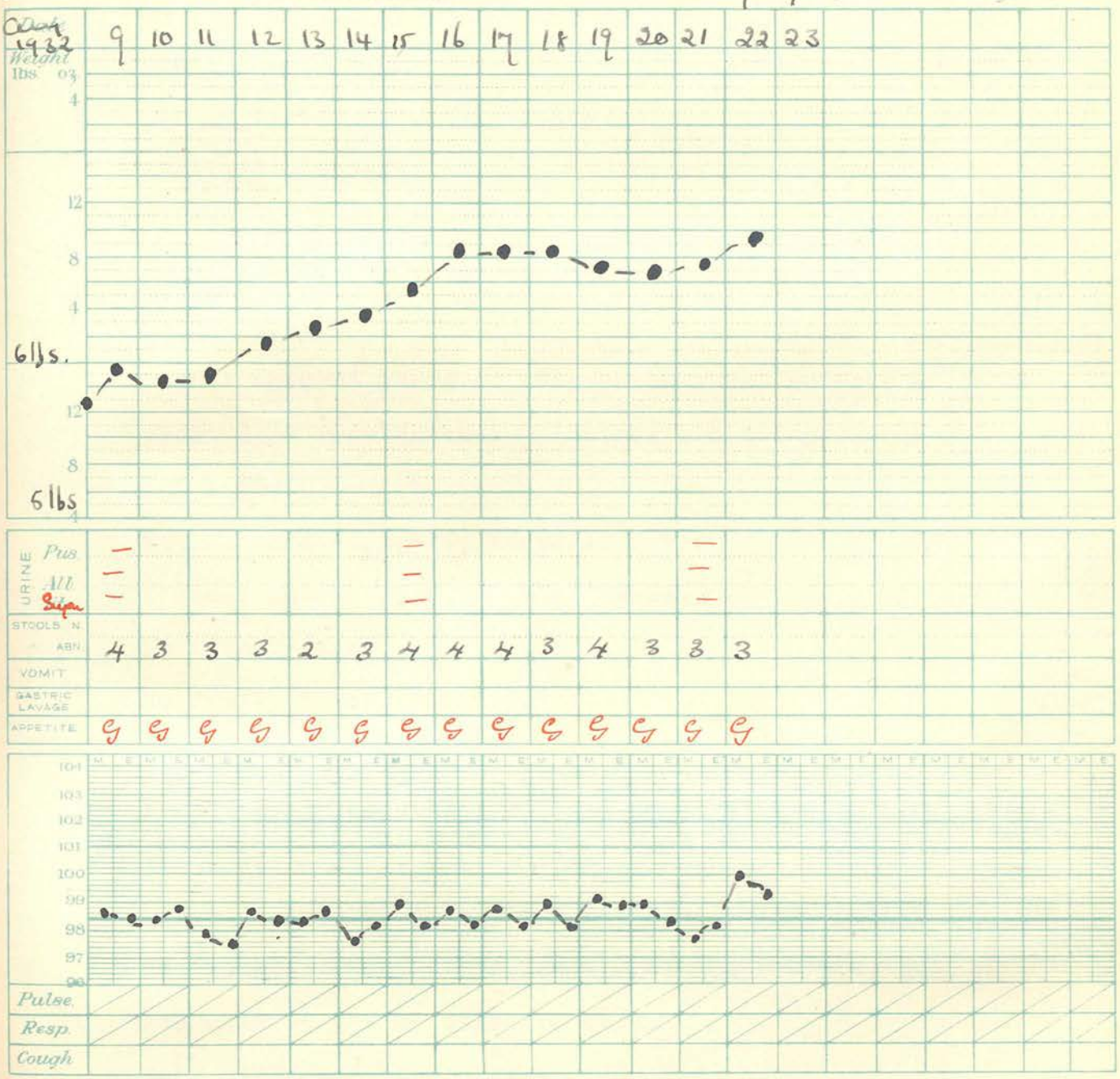
26.7.32 B. No 4. 7½ 28 ozs 7 feeds

+ Sister Laura's food.

TREATMENT

# THE BABIES' HOSPITAL NEWCASTLE

Name Jean W. Date of Admission 19.7.32 Age 4 months.




NOTES ON FEEDING

TREATMENT

# C A S E  XIII.

Name: Jean W.

Age on Admission: 3½ months.

Admitted: 19-7-32.

Reason for Admission:

I. Loss of weight.

Family History:

Mother aged 35 years. Pigmented skin, suffers a great deal from Asthma. (Mother's blood pressure 120 & 70).

Father aged 40 years, is well.

1 other child, aged 7 years. Well.

No miscarriages.

No family history of T.B.

Present History:

Full term baby, normal birth. Small at birth. Labour difficult, no instruments used but $CHCl_3$ given. About 2 days after birth of child, Mother had an attack of Asthma, showing a temperature, but was able to get up after 13 days.

Baby has never been breast fed. Fed on bottle. Cow's milk and Barley water in equal proportions. About ½ cupful from the bottle.

At about 5 weeks baby began to go downhill. Vomiting and diarrhoea. 6-7- stools in 24 hours. Green and yellow. No fits at any time.

Baby had been in hospital for diarrhoea and vomiting

from 26-5-32 to 2-7-32.

On admission on 19-7-32, child was small, pale and flabby. Cry normal, but much anæmia and below weight.

Cracks in skin behind ears. Septic spots on head.

Glands in both groins.

Fontanelle open but not bulging.

Mouth clean.

No cough.

Chest: nil. Heart: nil.

Abdomen: nil. No splenic enlargement. No rigidity.

Central Nervous System: nil.

Impression: Case of losing weight and retrogression due to sepsis.

Feeds A. No.3 - 7½ %. sugar 24 ozs. 6 feeds.

24-7-32: Mantoux negative.

Very slight rise in weight.

26-7-32: Septic spots appear to be clearing up.

Child is slowly improving.

Feed B. No.4. 7½%: 28 ozs. 7 feeds. plus Sister Laura's food.

1-8-32: Urine: clear.

4 relaxed, yellow stools.

Weight - very slight increase.

5-8-32: Weight is going up.

Stools increased to 5 in 24 hours, relaxed, yellow.

Septic spots have appeared on the legs.

Glands in groins still palpable.

Nothing in abdomen.

14-8-32: Has gained weight.

Infant appears to be improving.

Occasional little rises of temperature.

21-8-32: The increase in weight has been maintained and general condition much better.

28-8-33: Seen by me as an Out Patient - Aged 1 year 4 months.

Mother reports that child has had no illnesses since discharge from hospital. Makes attempts to walk.

The child is of average height and size for its age.

Does not present any evidence of skin sepsis.

No aural or nasal discharge, or eye discharge.

Intelligence good. Alert baby.

Fontanelle small - admits tips of 2 fingers.

There is no head bossing.

8 teeth are present. 4 upper ones and 4 lower ones and in good condition.

Muscles are flabby; hypotonic.

Heart: nil. Apex beat. 5th interspace.

No murmurs.

Lungs: Good expansion. Percussion note resonant throughout. Breath sounds - puerile and no accompaniments.

Ribs beaded.

Abdomen : pot belly.

Liver: just palpable. Spleen palpable.

Motions: normal: 2-3 per 24 hours.

Normal in colour and consistence.

Knee jerks present and equal.

There is slight enlargement of radial epiphyses.

Haemoglobin 48%.

Diagnosis: Mild Rickets.

## S U M M A R Y of C A S E XIII.

This is a typical example of a gastrointestinal case, regarded purely from that standpoint for several weeks. Ultimately septic manifestations appeared in the form of septic spots on head and then on leggs. The typical history was loss of weight. The infection must have been very mild, as it abated quite readily. The gastrointestinal symptoms were of parenteral origin.

The Haemoglobin at present is only 48%, but appears to be due to Rickets, and incorrect dietetic regime, which child has been subjected to.

The history of an asthmatic attack in the Mother after birth of child, points to aspiration of infection very early on in life. This must have influenced the baby's health and sown the seeds of sepsis.

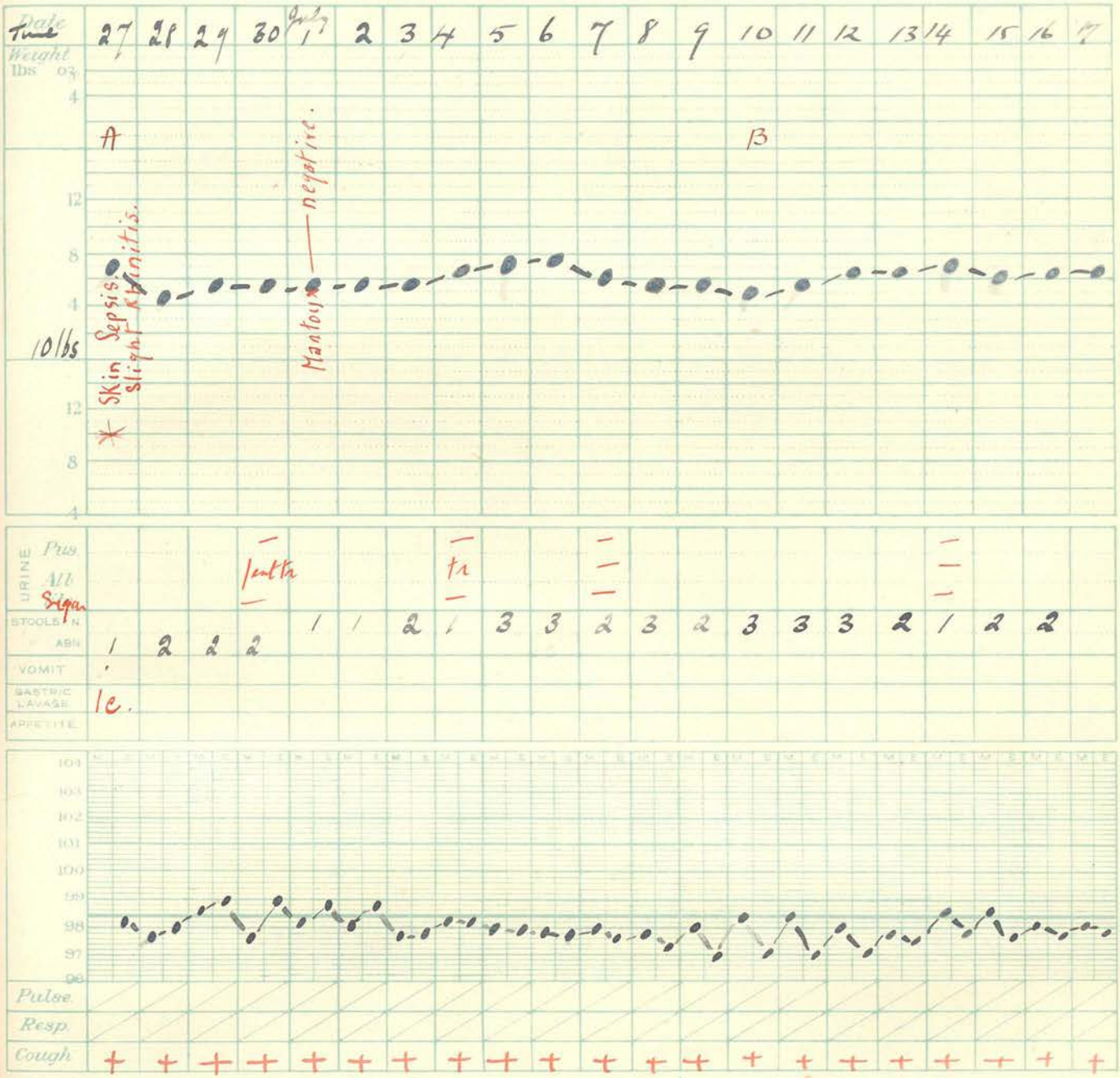
C A S E  XIV.

CHART 14 c.

Chart 14c. Page 1.

THE BABIES' HOSPITAL NEWCASTLE

Name Frank E. Date of Admission 27.6.30. Age 3 weeks.




NOTES ON FEEDING

27.6.30.
Feed A. No 4 : 7½ ¼ 30 ozs.

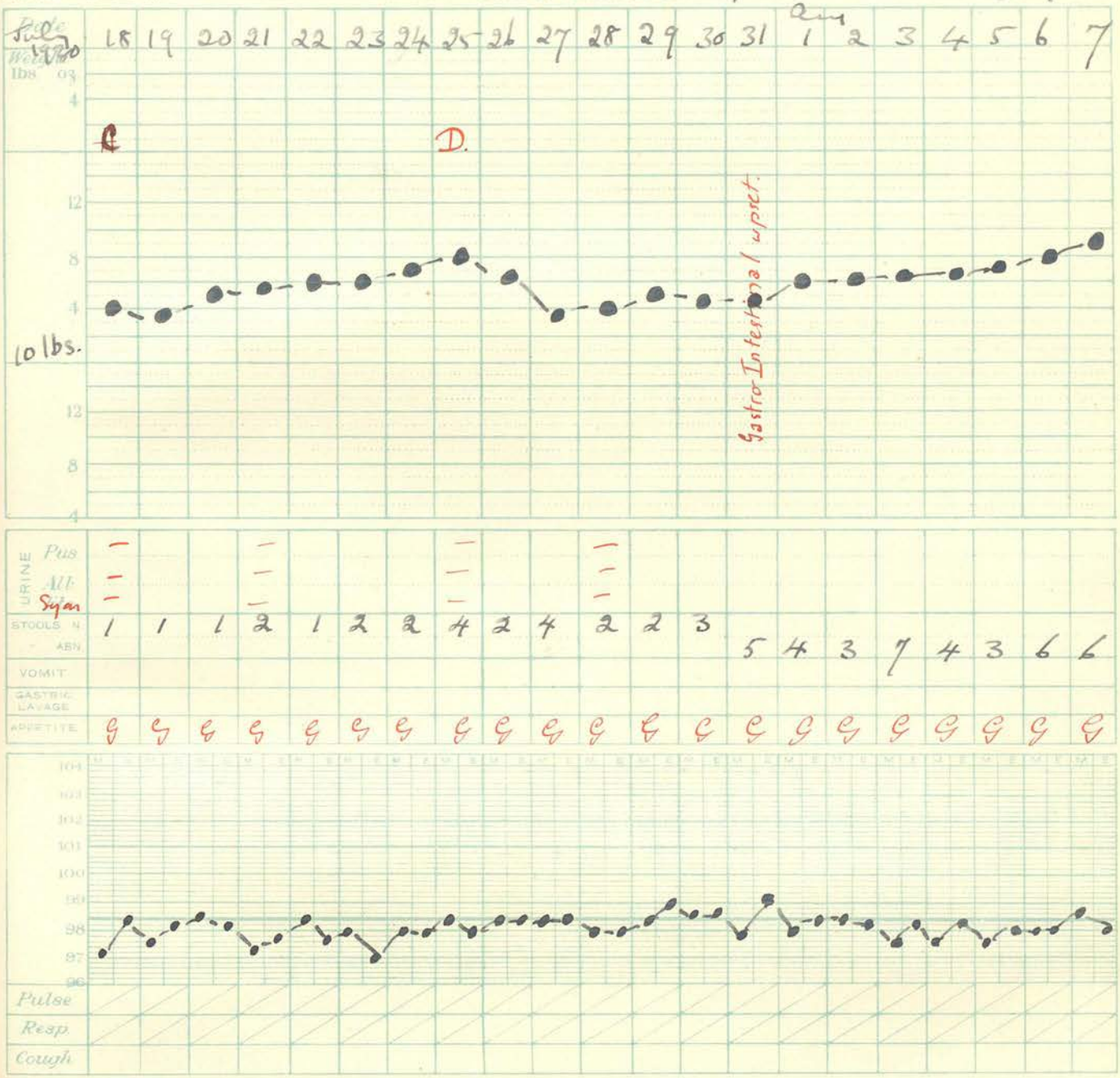
10.6.30 Feed B : same as above + cereal added.

TREATMENT

Page 2.

# THE BABIES' HOSPITAL NEWCASTLE

Name Frank E. Date of Admission 27.6.30 Age 4 mths.




NOTES ON FEEDING

28.7.30.
C. Add Soyolk 1oz. to No4 – 7½ ¼ : 30 ozs.

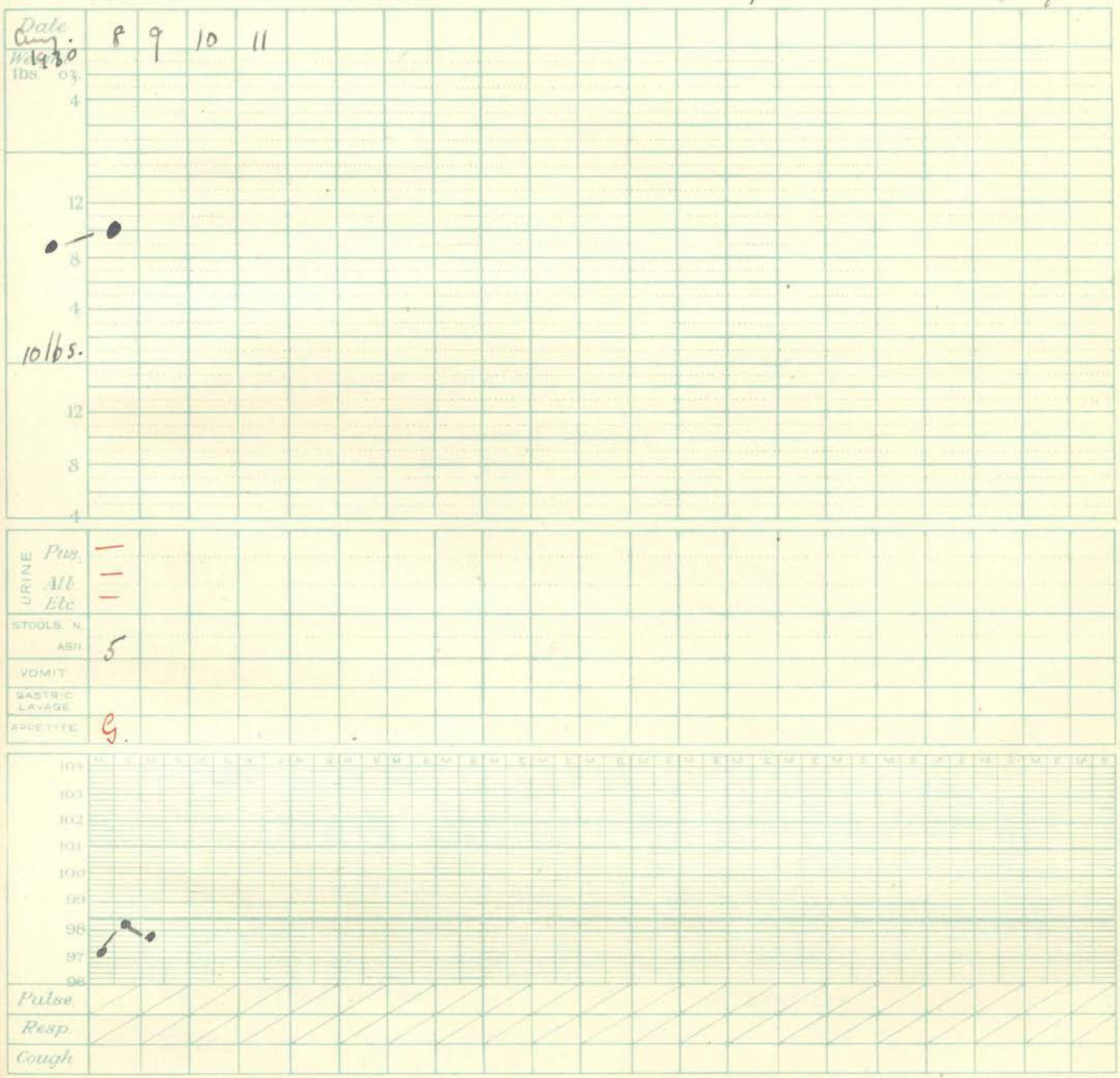
25.7.30.
D. Add. Soyolk 1½ozs " " " "

TREATMENT

1.8.30 Cod liver oil mxx b.d.

# THE BABIES' HOSPITAL NEWCASTLE

Name Frank E. Date of Admission 27.6.30 Age 4 wks.




NOTES ON FEEDING

TREATMENT

# C A S E XIV.

Name: Frank E.

Age on Admission: 3 months.

Admitted: 27-6-30.

Reason for Admission: I. Vomiting.

Family History:

Both parents healthy.

4 children aged 7 years
4 "
1 year 3 months
and patient.

No illness in the house.

Maternal grandfather died of tuberculosis.

Never lived in the house with baby.

Present History:

Full term: natural delivery. Birth weight 6 lbs. 13 ozs. Breast fed for 6 weeks. On Ambrosia for 4 weeks. Cow & Gate since.

Mother was advised to wean baby on account of vomiting.

Puerperium: normal. No rise of temperature. Mother up in 10 days.

Child has vomited after every feed since birth. Recently very large amounts and has lost weight. Has had septic spots on skin of limbs and trunk and scalp for several weeks.

Examination: Pale child with evident loss of weight recently. Is fairly well grown for age, but skin lies in loose folds. Skin is scarred and dry with blotchy colour. Scalp is dry with remains of scabs. Some nasal discharge. Enlargement of all cervical glands.

Active: takes feeds hungrily. The skin is curiously thick and hidelike.

Tongue: red, somewhat dry: coated at the back.

Fauces clean. No ulcerations. Ears clean.

Abdomen: Not distended: not hollowed.

Some irregular intestinal peristalsis seen - no gastric peristalsis.

Spleen not palpable.

Buttocks excoriated.

Chest: ? Slight impairment of right base posteriorly. Breath sounds vesicular: no adventitious sounds detected.

Heart: Nil. Abnormal.

Knee jerks brisk. Plantar flexor response both sides.

Impression: Generalised disturbance mainly intestinal from skin sepsis.

Food given. No.4. 7½% sugar: 30 ozs.

1-7-30: Child is taking feeds well.

Vomits occasionally: very small amounts only:

Wash out of stomach clean on 1st day. Has not been repeated.

Skin remarkably dry and inflexible still.

Chest: Some definite impairment of note of right chest with slight difference in the breath sounds. No crepitations detected.

Tuberculin - negative.

10-7-30: Cereal added to feeds.

1-7-30-21-7-30: Weight almost stationary - very occasional fluctuations.

18-7-30: Feed C. Soyolk added to feeds - 1 ounce to 30 ozs. feed.

21-7-30: Skin over trunk and limbs improving, but scalp still very dry and scaly. Baby happy and takes feeds well. Afebrile: quite stationary weight chart.

31-7-30: Stools frequent: relaxed: greenish yellow. Despite this the weight is well maintained and improvement in general condition has set in. Child made very slow progress, but ultimately decidedly improved and weight began to increase.

31-8-33: Seen by me - aged 3 years.

Mother reports that child has had no illness since discharge from hospital, though a recurrence of septic spots at the age of 9 months caused return to hospital. Child was admitted to High Teams Hospital, Gateshead, till skin condition cleared up.

Now a healthy looking boy of good size for his age and extremely intelligent in conversation.

Complexion good. No skin sepsis. No aural or nasal discharge.

Tongue slightly furred and moist. Tonsils little enlarged and red. No exudate.

Few glands palpable in submaxillary region.

Teeth are present and in very good condition.

Chest: Heart: Apex beat 5th interspace.

No murmurs: Sounds closed and pure in all areas.

Lungs: Good expansion. No percussion dullness.

Breath sounds puerile and no accompaniments.

Abdomen: Moves well with respiration.

No tenderness or abdominal pain.

Spleen not enlarged: Liver not palpable.

Urine: Microscopically no pus, albumen or sugar.

Stools: normal, 2 per 24 hours.

Central Nervous System: Pupils circular: equal: react to light and to accommodation.

Knee jerks present and equal.

No evidence of rickets anywhere.

Haemoglobin 65%.

## S U M M A R Y of C A S E XIV.

This case demonstrates the admission of an infant to hospital for vomiting and previous history reveals septic spots during past few weeks. The urine remained clear throughout and during stay in hospital there was no recrudescence of septic spots anywhere, except that infection reached the alimentary tract with the production of frequent relaxed stools.

However, infant overcame infection and was discharged as quite well. A recurrence of septic skin lesions occurred at the age of 9 months and this too was followed by recovery.

No history of pueral sepsis was given and labour was quite natural, though it is obvious that infection took place very early in life, the source of which is unknown here.

C A S E  XV.

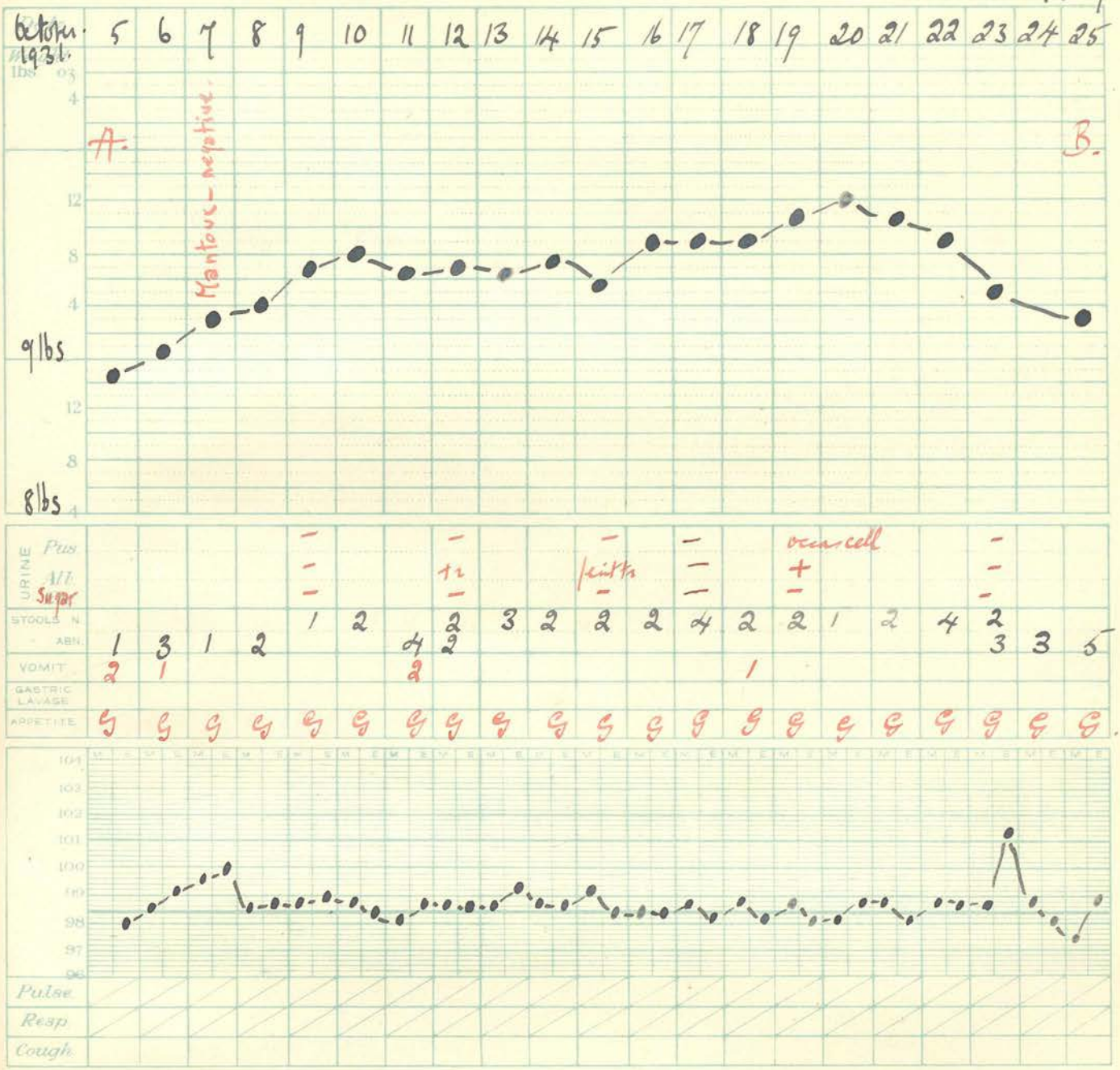
CHART 15c.

Chart XV c

THE BABIES' HOSPITAL NEWCASTLE

Page 1.

Name Annie K. Date of Admission 5·10·31 Age 3/12 yrs.




NOTES ON FEEDING

5·10·31.

A. No 4. 7½ 2 ozs : 7 feeds.

25·10·31.

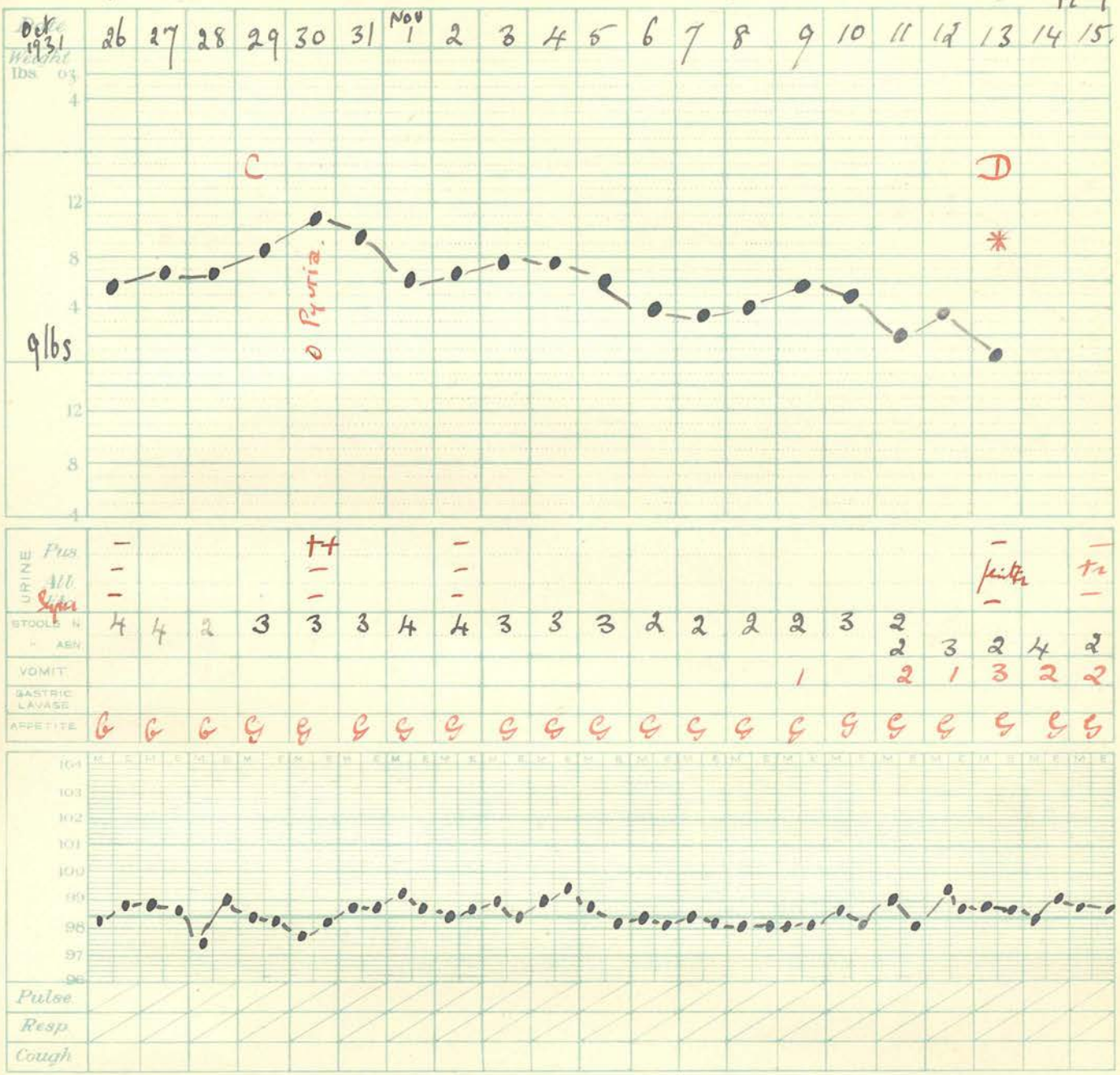
B. No 4 7½ 2½ ozs : 7 feeds.

TREATMENT

8·10·31. Idozan zss b.d.

# THE BABIES' HOSPITAL NEWCASTLE

Name Annie K. Date of Admission 5·10·31. Age 3/12 years.




NOTES ON FEEDING

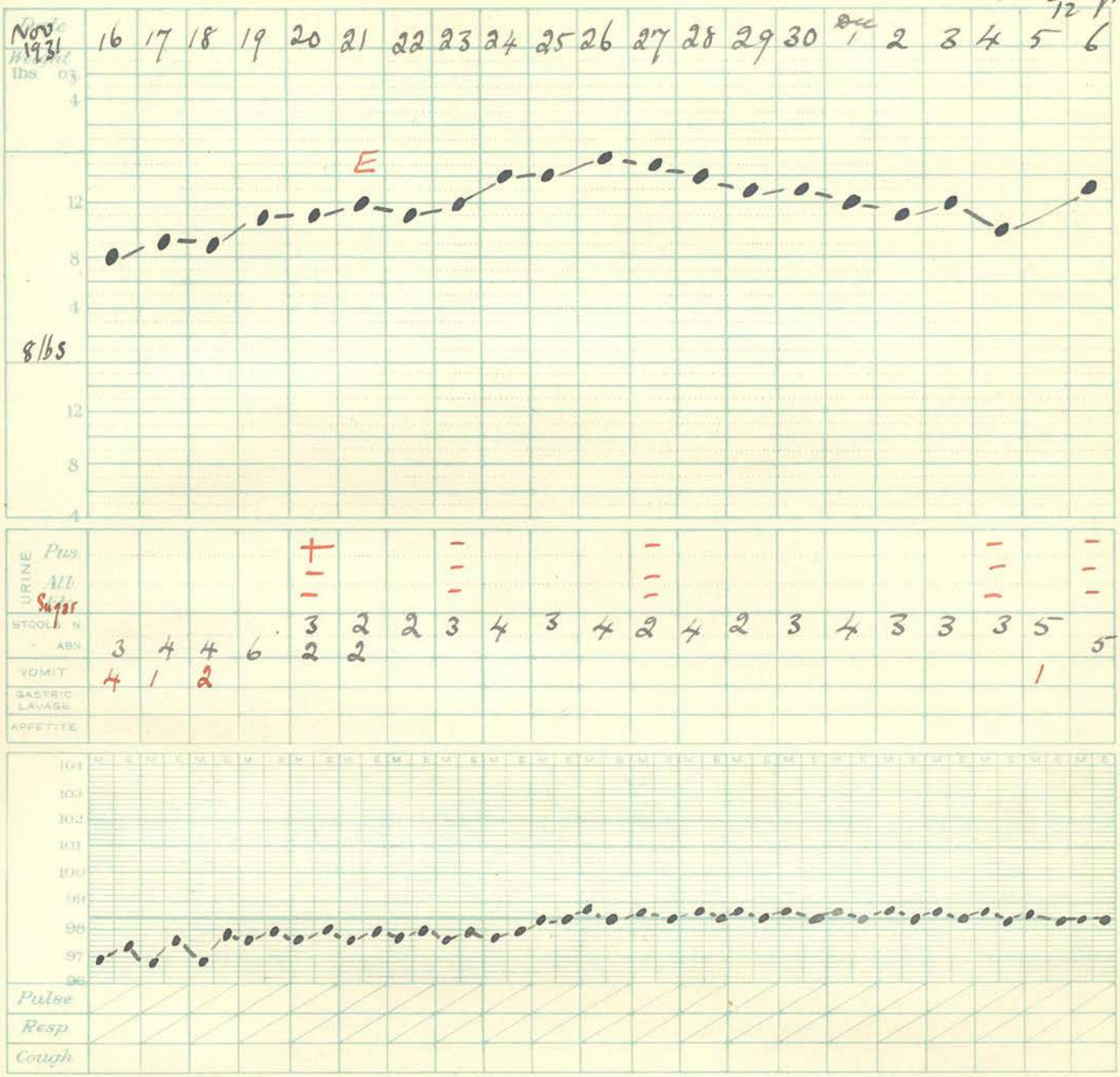
C. 29.10.31.
No 4 7½ 4 30 ozs + cereal. 6 feeds.

D. 13.11.31. Lactic acid 2T
No 3. 7½ 4 30 ozs : 10 feeds.

TREATMENT

THE BABIES' HOSPITAL NEWCASTLE

Name Annie K. Date of Admission 5·10·31. Age 5/12 yrs.



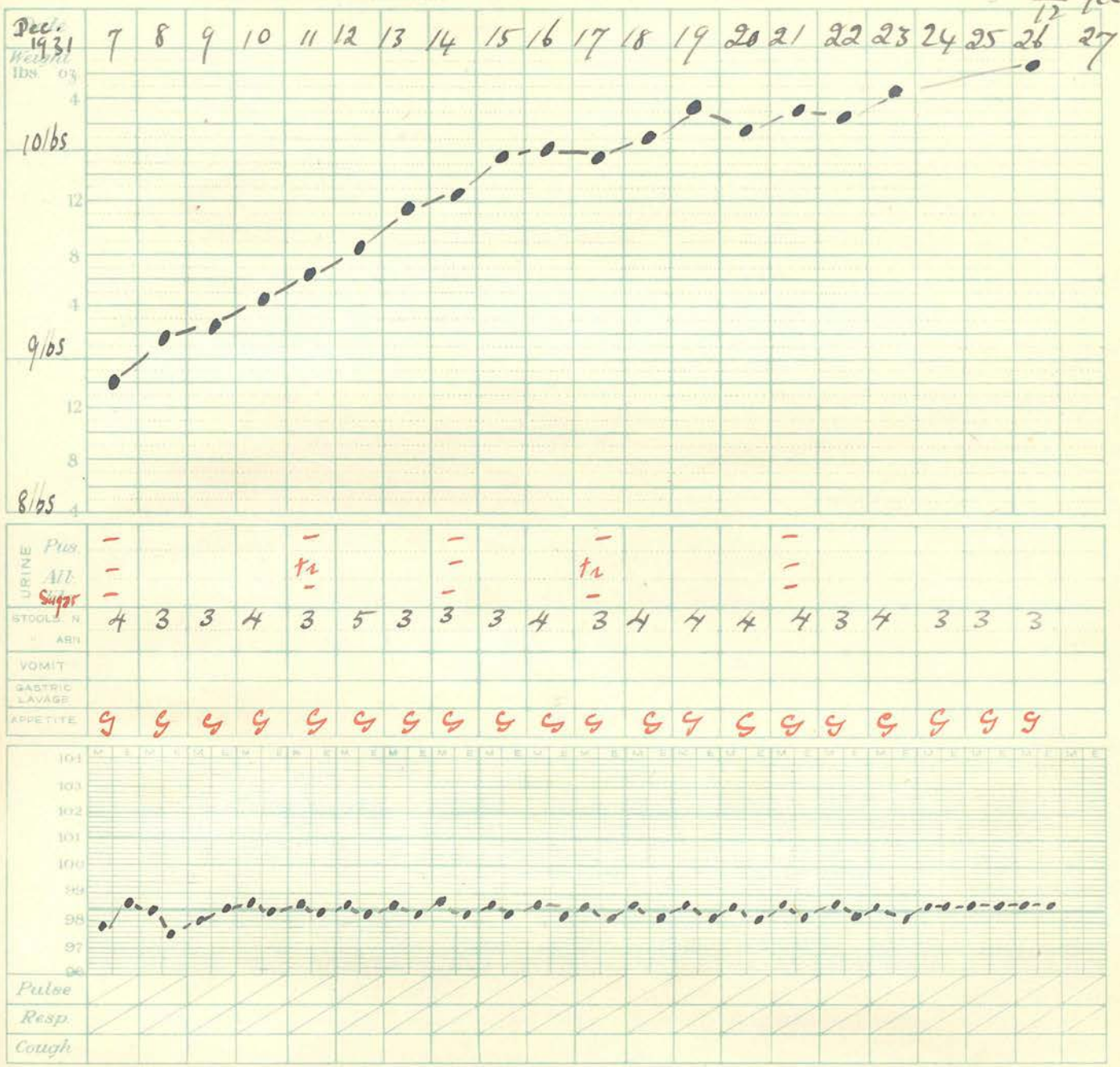

NOTES ON FEEDING

21·11·31. E. No 4 7½ 4 30 ozs : 7 feeds. + Cereal.

TREATMENT

# THE BABIES' HOSPITAL NEWCASTLE

Name Annie K  Date of Admission 5·10·31  Age $\frac{5}{12}$ years.




NOTES ON FEEDING

No 4 7½ ¼ - 30 ozs + cereal : 6 feeds.
+ Vegetables 2 teaspoons.

TREATMENT

# C A S E  XV.

Name: Annie K.

Age on Admission: 3 months.

Admitted: 5-10-31.

Reasons for Admission:

I. Losing weight.

II. Underfeeding.

Family History:

Mother alive and well aged 29 years.

Father alive and well aged 30 years.

4 other children aged 8 years
7 "
3 "
1¾ "
and the patient. Others quite well.

1 died aged 11 months with diarrhoea.

No family history of T.B.

Present History:

Normal healthy born child: full time:breast fed for 2 months. Normal labour - puerperium 10 days - no temperature - no breast abscesses in mother. No signs of ill health.

Age of 10 days infant developed a breast abscess on right breast - this was incised at the Infirmary. After coming out of the Infirmary baby gradually went backwards with vomiting and diarrhoea until age of 3 months, when child was admitted to hospital for treatment.

Examination:

Pale, rather thin child - the skin over the abdomen and legs is rather lax. Baby has acid stools with excoriation of the buttocks. The skin of the face is rather blotchy.

Glands: There are a few enlarged glands in the neck. Tonsils are not enlarged.

Nose and nasopharynx: There is some nasal discharge. Ears no discharge. There is a marked tendency to rib beading: Craniotabes:- fontanelle admits 3 fingers.

Chest: There is good expansion, no increase of respiration, but baby has a bad cough. There is no dullness or tubular breathing, but there are adventitious sounds to be heard over the lungs in front, indicating a mild degree of bronchitis.

Cardiac region: No hypertrophy.

Impression: An infected child, the abscess of breast was probably staphylococcal and she is now suffering from the after effects of this.

Feed A given. 7½% sugar. 21 ozs. 7 feeds.

7-10-31: Mantoux negative.

9-10-31: Slow gain of weight. Very active child takes food well, no further abscesses.

11-10-31: Vomiting and Diarrhoea have set in, baby not so well.

19-10-31: Urine: occasional pus cell, Albumen present, no Sugar.

23-10-31: Progress is slow.

Temperature 101°. No physical signs in chest.

25-10-31: Feeds increased to 28 ozs.

Stools 5 very relaxed.

Weight going down.

29-10-31: Feed C. 30 oz. plus cereal given.

Weight is only slowly going up.

30-10-31: Urine: microscopically - abundant pus cells, no Albumen , no Sugar.

3 normal stools.

11-11-31: Stools more frequent 2 yellow and 2 relaxed.

2 vomits.

13-11-31: Feed D. 30oz. together with the addition of Lactic acid.

11-11-31 - 15-11-31: Condition is unsatisfactory, there is vomiting, frequent relaxed motions.

Urine shows a trace of Albumen, but nothing else of importance from the urinary examination.

20-11-31: Pus has reappeared in the urine.

For past few days stools have been frequent and very relaxed. Vomiting has been present too.

16-11-31: There were 4 large vomits.

21-11-31: Feed E. given. 30 oz. plus cereal

27-11-31 - 6-12-31: Slight improvement, though the stools are frequent they are small and appear to be almost normal together with this weight is being maintained now.

7-12-31: - 15-12-31: Very slow progress.

Urine clear except for an occasional trace of albumen.

Stools 3-4 per day, normal.

16-12-31 - 26-12-31: Progress is good.

The weight has gone up steadily.

Urine is clear. Stools 3-4 per day, normal.

Patient seen by me on the 1-9-33 aged 2 years.

Fairly well grown child for her age, rather plump and flabby looking, and has aslight drag of left leg. The head is larged and bossed in both the frontal and parietal regions. The anterior fontanelle is closing now. There is no aural or nasal discharge. Tongue clean. Tonsils red, not enlarged. There are a few enlarged glands in the anterior cervical region. Teeth are mostly all present and in poor condition, central incisors are carious. The mucous membranes are pale and anaemic.

There is a linear scar about 2 inches long over the right breast traversing the nipple.

Child is rather irritable, but quite intelligent for her age

Examination of the Chest:

Heart: Apex beat in the 5th interspace.

No murmurs, sounds closed and pure in all areas.

Lungs: Good expansion, no percussion dullness.

Breath sounds puerile and no accompaniments.

Abdomen: Distended. No hyperaesthesia of the skin. There is no splenic or hepatic enlargement.

Motions are dark and loose.

Bony deformities:

I. Bossing of head.

II. Enlargement of radial epiphyses.

III. Bowing of the tibiae.

IV. Slight rib beading.

Central Nervous System: Pupils equal, circular, react to light and to accommodation. Knee jerks present and equal on both sides. Plantar flexor response on both sides.

Haemoglobin 55%.

## S U M M A R Y of C A S E XV.

This case is of great interest in that though the labour and puerperium were reported as perfectly normal, ten days after birth the infant developed a breast abscess. This obviously points to an infection at delivery and an early manifestation of sepsis. This primary breast infection is soon followed by vomiting and diarrhoea and subsequent pyuria, a frequent sequence of events in all these cases.

At the age of 3 months "marked tendency to rib beading" was reported. Apparently the rachitic element appeared early in life, at present the child has established rickets and a haemoglobin of 55%, probably traceable to the latter condition.

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